

NAVAL POSTGRADUATE SCHOOL MONTEREY, CALIFORNIA



THESIS

**RELATIONSHIP BETWEEN ECOLOGY AND SECURITY
SHOWN BY THE EXAMPLE OF THE CENTRAL ASIAN
REGION AND POLICY-ORIENTED GLOBAL APPROACHES
TO PREVENT ECOLOGICALLY INDUCED CONFLICTS**

by

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June 1997

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APPROACHES TO PREVENT ECOLOGICALLY INDUCED CONFLICTS**

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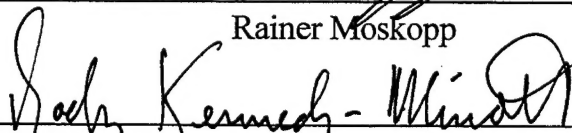
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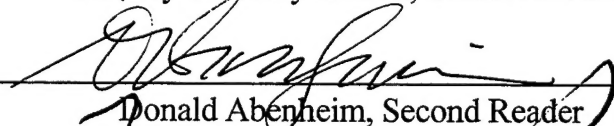


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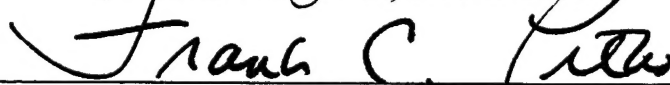
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ABSTRACT

In order to ensure future security, the nations of the world must deal putatively with global-wide ecological problems. These problems include; ecological degradation and scarcity of resources, they demonstrate the explosive force of ecologically induced conflict. Many conflicts in the Central Asian region are the result of ecological transformation in combination with other sources of conflict. Preventive measures should be created at the international, regional, and national level for dealing with these ecologically induced risks and settling already existing conflicts. This study addresses the role and significance of these risks in the sense of security and conflict studies. The study examines the current situation in the Central Asian region and the relationships between existing ecologically induced risks and security. Preventive measures for the region are analyzed and assessed. Finally an approach to a comprehensive global system of policy-oriented measures to prevent ecologically caused conflicts will be discussed and developed.

An increased sensitivity to ecologically induced conflict and a general review of the meaning of security is needed. International law, a renunciation of sovereignty and international institution-building are necessary for the creation of a global approach to meet this new global challenge.

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EXECUTIVE SUMMARY

The relationship between ecology and security is increasingly debated. The global dimensions inherent in ecological sources of threat are gaining more importance. Ecological degradation and resource scarcities are potential causes for conflict. This is especially true for developing countries.

In this thesis terms are defined and the field of examination is identified. The role and the significance of ecological sources of threat in the sense of security and conflict studies are shown. The findings of several studies addressing the relationship between ecological factors and conflicts have proven a causal connection between harmful ecological transformation induced by human activities and conflicts. The studies found that ecological transformation, in addition to ethnic aspects, population growth, economic decline and political stability are the root causes for numerous violent conflicts. This is the base assumption for this examination of ecologically induced conflicts in Central Asia.

The study will examine the current situation in the Central Asian region and the relationships between existing ecologically induced risks and security. The following questions are posed:

- What are the significant ecological causes for conflict with regard to evolving interaction between ecology and security in Central Asia?
- What is the relationship between ecological causes and other causes of conflict in Central Asia?

Additionally, this study will measure, analyze and assess the behavior of the governments and organizations in solving the problems of the Central Asian region.

This study should provide insight into the extent of existing conflicts related to harmful ecological transformation induced by human activities. After the collapse of the Soviet Union and the independence of the new Central Asian republics, one politically relevant cause for conflict was water distribution. The Aral Sea basin as an ecogeographical region became

incongruent to the territorial boundaries of the new republics. This formerly common water resources were abruptly seen as an individual sovereign resource. The ecological problems such as soil degradation, water pollution, climate change and health problems are often ignored.

Normally the relationship between ecological causes for conflict and conflicts is not mono-causal. Different causes for conflict are acting in combination, ecological as well as other socio-economic factors. Conflicts occur between the independent states as well as within those states.

The awareness of the extent of ecological risks and its relevance to security is not well developed. In the Central Asian region, national interest and economic growth are the primary objective. This disregards harmful ecological transformations and their potential for conflict. The economic inter-dependence and common economic hardship of the new states service as a counterbalance to the outbreak of conflict. However, extreme economic decline in the region may enhance change the focus to the individual interests and disregard the necessity for cooperation. Anticipating such a situation, apparently open conflicts, especially over water resources may escalate.

The current conflicts show that the available mechanisms and instruments for conflict settlement are not sufficient. Intra-regional activities are controversial and the willingness of the republics to transfer rights and responsibilities to intra-regional institutions is weak. Legally binding agreements are established but not unrestrictedly recognized. The ecological catastrophe concerns all states, but the activities to solve these problems are less developed. Significant preventive measures are only taken to fight the water problem. The new independent republics of Central Asia are trying to internationalize these problems by involving the world community.

Furthermore, the study presents an approach to a comprehensive global system of policy-oriented measures to prevent ecologically caused conflicts. This approach is discussed and developed. The findings of the study of the Central Asian region have unexpectedly significant implications to international security policies. This does not mean that the findings

from the Central Asia case should be generalized. This would be misleading and methodologically it is not permissible. But the results may lead to thinking regarding the global level. Although many ecologically induced conflicts in Central Asia take place on the national level, the outcome of the study shows an international dimension, inherent to ecological risks.

Currently the world community is not prepared to solve these problems. The first step is an increased awareness of these new global threats that endangers our security. This includes a review of our perception of that security. Further, the following policy-oriented activities are significant measures to prevent ecologically induced conflicts:

- International ecological law should be improved.
- Surrender of sovereignty has to be considered (surrender some sovereignty).
- Institution-building, especially on global level has to be associated with a functional international management (monitoring, verifying compliance, enforcement).
- Increased application of cooperative mechanisms and regime-building, new models of diplomacy and intensification of cooperation.
- As a part of cooperation especially between developing and developed countries, capacity building is important.

The progress on recommendations largely depends on consent. This is the primary reason why it is difficult to realize global oriented measures. The improvement in international ecological law seem necessary to build a framework for partial surrender of sovereignty. This is a premise for efficient institution-building. The difficulties of consent building may take significant time for realization. A group of the major powers such as the Group of Seven in an enlarged form may be able to support and accelerate this process. Probably success within this group depends on the informal leadership of one major power. This could be a new role of leadership for the U.S.

I. INTRODUCTION

The issue of the relationship between the environment and security has been increasing in importance during recent years. It has become evident that local, regional and global environmental degradation as well as scarcity of natural resources have a large potential to trigger and contribute to serious conflict that may lead to social disruption and violent conflict within as well as between states.¹

Governments will be increasingly involved in grappling with global issues, for instance the environment (See Figure 1). These issues will constitute an extraordinary future challenge to the world community.

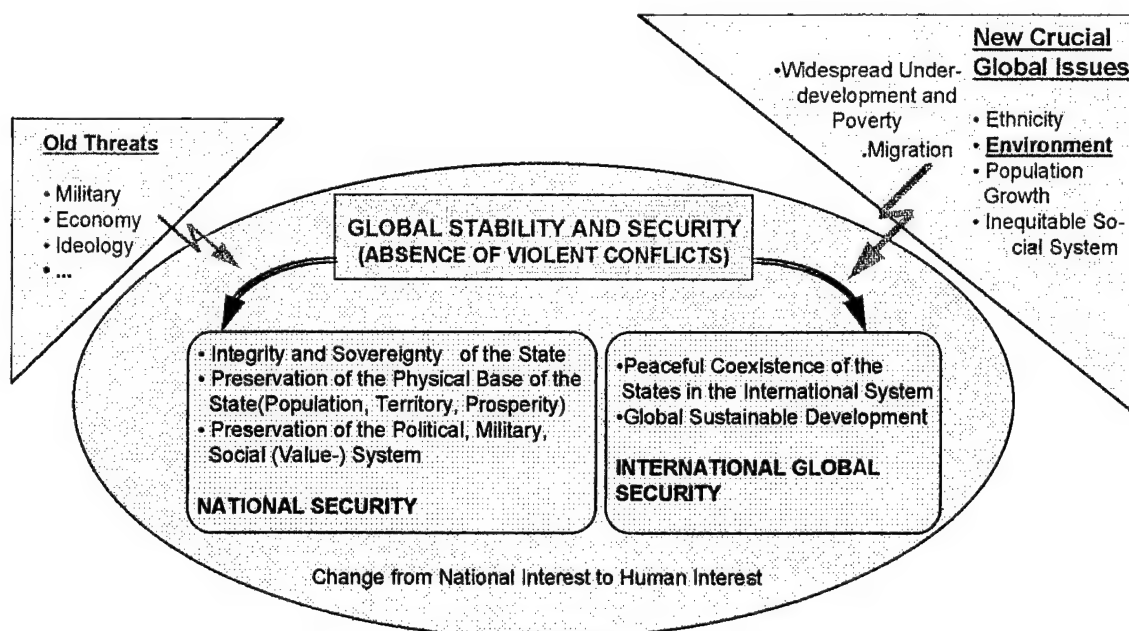


Figure 1. New Risks and Challenges to Security Policy

[T]he once sharp dividing line between foreign and domestic policy is blurred, forcing governments to grapple in international forums with issues that were contentious enough in the domestic arena.²

¹ Ecologic-Centre for International and European Environmental Research, Potsdam Institute for Climate Impact Research, Berlin, (ed.), NATO CCMS Pilot Study, Environment and Security in an International Context, State of the Art and Perspectives, Interim Report, October, 1996, p. 4.

² Mathews, J. T., Redefining Security, in: Foreign Affairs, Vol. 68, No. 2, 1989, p. 162.

Besides other new risks to national and international security, the pervasiveness of environmental problems throughout the world calls for a different dimension in human thought and action. Traditional academic disciplines and individual nations as basic actors cannot address global issues such as population growth, migration, and ecological problems.

The challenges facing us today are far more complex than previously, and we need a wide range of instruments at our disposal in order to meet them ... It is ... an effort to *promote* environmental protection, the responsible management of resources and sustainable development, and to *prevent* conflict and instability.³

In order to attain these goals, global wide measures must be examined and introduced. Thinking about preventive measures with regard to harmful ecological transformation and resulting causes for conflict is an absolute requirement for solving a part of rising problems of the third millennium. This thesis analyzes and develops approaches to a global system of policy-oriented measures which may deal with problems, general and specific, to prevent ecologically induced causes for conflict. This system may also settle ecologically induced conflicts.

The Central Asian region is significantly confronted with these problems and is used in this study as an example in order to gain an overview of their complexity. With the end of the Soviet era, ecological problems in this region have become publicly known (dessication of the Aral Sea, soil degradation, water scarcity). The Aral Sea basin as an ecogeographical region became incongruent to the territorial boundaries of the new independent republics. Common water resources were, with the end of the Soviet era, abruptly seen as individual sovereign resources. This and other aspects are indicating a proneness for an ecologically induced potential of conflict. An examination of the Central Asian region should provide an insight into the extent of ecological degradation and resource scarcities and the ecological relationship to existing conflicts.

The number of ecologically induced conflicts in this region shows the need for the development of preventive measures beyond the level of state or national sovereignty.

³ Bjerke, S., The Environment and Security in the North Atlantic Region (speech at a conference, published on the internet), Reykjavik, 7 September 1995, p. 7.

Ecologically caused conflicts take place most often in regions with developing countries.⁴ In this study the example is the newly independent Central Asian states of the former Soviet Union. The functional relationship between society and environment as a factor for development may have been recognized too late. Even then the sensitivity to the catastrophe and the necessity for the creation of preventive measures is poorly developed and unrealized. This is especially true for countries with agricultural dominated economies that have been confronted with the consequences of ecological transformation.⁵

The tremendous increase in the cultivation of cotton in this Central Asian region and the pressure to enhance the yields of cotton has led to ecological degradation and a scarcity of resources. The extension of irrigation systems has led to water shortages. The struggle for water resources as a consequence has been aggravated, as the republics became independent. The increasing utilization of water for irrigation systems has caused additional ecological problems. Arable land is exposed to salinization and erosion, which has led to land shortages in addition to the water shortages.

The water for irrigation is taken from tributary river flows that feed the Aral Sea. Because of that, the Aral Sea does not receive enough water to renew itself. The consequences are catastrophic: desiccation of the Aral Sea, desertification and salinization of the desiccated sea bottom, deflation of toxic dust (pesticides, fertilizer) with negative effects within and probably even beyond the region. For parts of the population, living conditions have deteriorated greatly. Fisheries, for instance, cannot sustain themselves, because of the desiccation and the increasing salinization of the Aral Sea. The land and water shortages, and the impoverishment of vast parts of the Central Asian region, are causes for conflict.

In this examination, the ecologically induced conflicts in Central Asia will be identified and analyzed. The role and importance of ecological causes for conflict will be examined. In addition, preventive measures for specific cases will be considered. In order to provide a more

⁴ See: Chapter VI, Section B, Subsection 7.

⁵ Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung*, Abschlußbericht des Environment and Conflicts Project ENCOP, Vol. I, Verlag Rüegger AG, Chur/Zürich 1996, p. 1.

global approach of providing solutions to the consequences of ecological harmful transformation induced by human activities, implications from the Central Asia region are useful. This does not intend to generalize regional findings which may be misleading and methodologically not a permissible result. For a generalized method the examination of more cases would be required.

Before this, first of all, some terms should be defined, the field of examination will be described and outlined and the increasing significance of the relation between environment and security and its conceptual bases will be shown.

Finally, this thesis draws conclusions concerning the:

- Significance of ecological transformation induced by human activities
- Consequences of ecological transformation and ecological causes for conflict
- Importance and extent of ecologically induced conflicts
- Necessity for the development of preventive measures and an approach to a global system of policy-oriented measures to prevent conflicts and settle those conflicts

II. DEFINITION AND DESCRIPTION OF THE FIELD OF EXAMINATION

A. DEFINITIONS

1. Causes for Conflicts

In order to describe a certain situation or stage of a conflict more specifically, it is necessary to specify the term conflict according to different criteria. Before discussing conflicts it is necessary to focus on causes for conflict, and the earlier developmental stage for the creation of conflicts. The causes for conflict are divided in "latent," "potential" and "relevant" causes.⁶ (See Figure 2)



Figure 2. Process of Causation of Conflicts

Ecological transformation can be a source for these causes of conflict. Ecological transformation in combination with an occurring or already existing proneness to conflict or other "relevant" causes for conflict can evolve into conflicts with different qualitative and quantitative dimensions (See Figure 3). Addressing the quantitative dimension, conflicts should be divided into international and national conflicts. In the qualitative dimension and in this study a differentiation is made between types of conflict and the severity of conflicts.

In the following discussion the term conflict should be differentiated according to the severity of conflicts. An "open conflict" is a conflict with low severity. Cause for conflict does exist and a proneness to a more severe conflict is recognized. This conflict is at an early stage with a probability of peaceful conflict settlement. But conflict escalation and the probability of

⁶ "Latent" means: "hardly to become visible or obvious, but the possibility may exist - hidden, almost not yet known". The sense of "potential" is "imaginable - possible in contrast to real/actual". The probability to occur and evolve to a conflict is more probable than among "latent" causes for conflict. "Relevant" causes for conflict are understood as "actually existing and at the moment present."

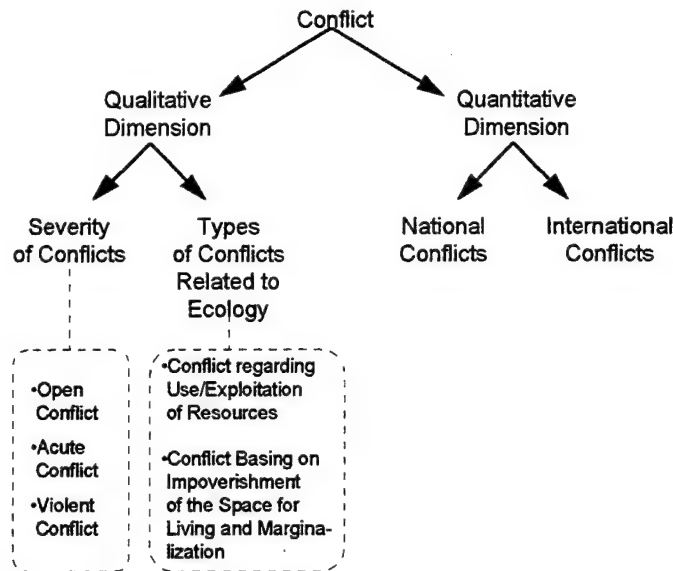


Figure 3. Distinction of Conflicts

violence cannot be excluded. A conflict of medium severity is defined as “acute conflict.” These are conflicts at an early stage with the probability of escalation involving a substantial probability of violence. “Violent conflicts” are the highest level of severity. This term encompasses an ongoing violent conflict or the history of armed conflict in the recent past. Using only the term conflict in this paper means open conflicts. Otherwise, the conflicts are specified according to the severity of conflicts. (See Table 1).

Terms Of Conflict According To Severity	Description Of Conflicts
Open Conflict Low Severity	Existence of a Cause for Conflict and a Proneness to Conflict, Early Stage with Probably Peaceful Conflict Settlement
Acute Conflict Medium Severity	Early Stage with probability of Escalation and Substantial Violence
Violent Conflict High Severity	Ongoing Violent Conflicts and Recent Outbreaks

Table 1. Severity of Conflicts

Differentiation of types of conflict is based on disputes over use and exploitation of resources and impoverishments to a specific area. For example, the deliberate degradation of a region, with an expected consequence of decreasing living conditions of the inhabitants. Another example of this is the Aral Sea region, which has been termed a sacrificed area. Certainly, there are other types, but for this study of the Central Asian region only these two types of conflict are important.

2. Threat - Preventive Measures - Ecogeographical Region

The following description defines the term "threat" as used in this study:

[A] threat to national security is an action or sequence of events that (1) threatens drastically and over a relatively brief span of time to degrade the quality of life for the inhabitants of a state, or (2) threatens significantly to narrow the range of policy choices available to the government of a state or to private, non-governmental entities (persons, groups, corporations) within the state. Within the first category might come the spectrum of disturbances and disruptions ranging from external wars to internal rebellions, from blockades and boycotts to raw material shortages and devastating "natural" disasters such as decimating epidemics, catastrophic floods, or massive and pervasive droughts. These are for the most part fairly obvious: in their presence any observer would recognize that the well-being of a society had been drastically impaired. The second category is perhaps less obviously apposite. In considering it, it may be helpful to reflect ... the threat from Nazi Germany [Suppose Germany would have been successful] [t]hat would have meant fewer opportunities for American traders and investors.⁷

Anticipating current scientific prognosis of ecological appearances the apparent existing ecological problems are, ozone depletion, deforestation etc. These are already understood as threats according to the above definition.

"Preventive measures" should encompass activities to prevent and to resist ecologically induced conflicts. For example, institutionalization, creation of agreements, mechanisms and instruments for managing and prevention of the causes for conflict and mechanism for the settlement of existing conflicts.

Preventive measures can be divided between the qualitative and a quantitative dimension. In the quantitative dimension these measures can be divided into the national and local level, or the regional and international level. The qualitative dimension distinguishes between science-orientated and policy-orientated preventive measures (See Figure 4).

⁷ Ullman, R. H., Redefining Security, in: International Security, Vol. 8, No. 1, 1983, p.133-134.

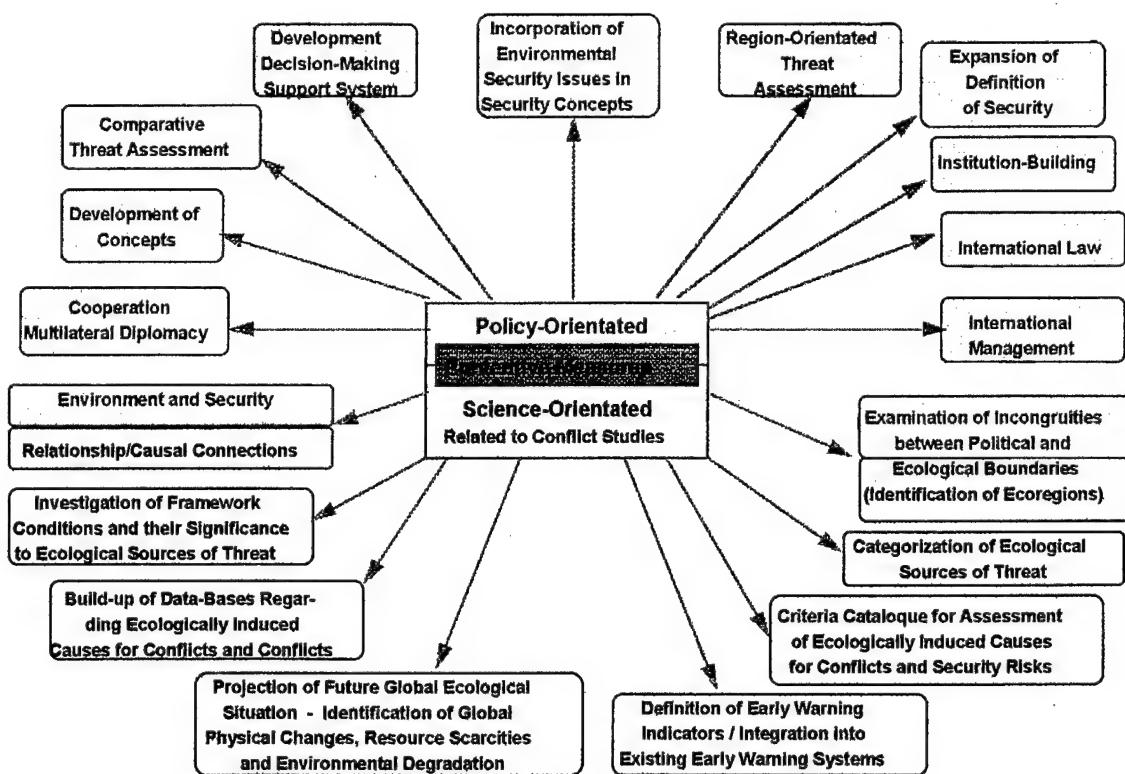


Figure 4. Differentiation of Preventive Measures

In the quantitative dimension, the primary focus after examining the Central Asian region, is on action at the international level and on multilateral policies. Several aspects support this focus. Ecological problems either have or acquire an international dimension. Many challenges are global in themselves and most of these are associated with the developing world.⁸

This thesis focuses on policy-oriented measures in reference to conflict prevention and conflict settlement (e.g., institution-building, establishment of legally binding agreements, handing over of rights and responsibilities to international institutions). In Figure 4 only science-oriented measures related to conflict studies are mentioned. Not all science-oriented

⁸ See: Figure 21. Ecologically Induced Conflicts Worldwide p. 105, Ecologic-Centre for International and European Environmental Research, Potsdam Institute for Climate Impact Research, Berlin, (ed.), NATO CCMS Pilot Study, Environment and Security in an International Context, State of the Art and Perspectives, Interim Report, October, 1996, p. 18.

measures⁹ are stressed. Doubtless other measures are of the same importance as the mentioned policy oriented measures, but are in a different academic discipline, and are not the object of consideration in this thesis.

This paper focuses on "ecogeographical region" (ecoregion) as a certain geographical area

... that is unified in an ecological sense, gaining its integrity from this cohesion. The concept of such an ecogeographical region is essentially that of an ecological system, or ecosystem; that is to say, a unit made up of living and non-living components of the environment that interact to form a life-support system.¹⁰

Regions need not be congruent with state borders. In order to emphasize the geographic significance of ecologically induced conflicts, conflict studies use this term deliberately. For instance up/down-stream disputes along river flows in different sovereign states, are typical causes for conflict.

In this study the Central Asian region will be considered as an ecogeographical region, encompassing Kazakhstan (Southern parts), Uzbekistan, Turkmenistan, Kyrgyzstan and Tajikistan. The former soviet and economic view the above mentioned states excluding Kazakhstan constitute an economic region. According to this studies' ecogeographical view

⁹ Science-orientated measures in general mean especially the solution of specific technical, economic and socio-demographic problems. For instance, new technologies which save resources, new energy strategies and raising the efficiency of energy, new agroforestry techniques to replace the need for fertilizer and improve soil quality, family planning in order to stop one significant cause of environmental degradation and change in behavior of consumption (probably more political orientated measure), economic optimization with regard to minimum/maximum-principle, "Achieving sustainable economic growth will require the remodeling of agriculture, energy use and industrial production after nature's example - their reinvention." (Mathews, J. T., *Redefining Security*, in: *Foreign Affairs*, Vol. 68, No. 2, 1989, p. 171.), invention of processes that use materials and energy with high efficiency, recycle by-products and produce little waste and for example, invention of a set of indicators by which global environmental health could be measured. Also the field of examination of early-warning-indicators and identification of criterias for ecologically induced security threats related to security studies are not objects considered in detail. However, instruments of risk identification are very important. "The lesson is this: current knowledge of planetary mechanisms is so scanty that the possibility of surprise, perhaps quite nasty surprise, must be rated rather high. The greatest risk may well come from a completely unanticipated direction. We lack both crucial knowledge and early warning systems." (Mathews, J. T., *Redefining Security*, in: *Foreign Affairs*, Vol. 68, No. 2, 1989, p. 171.) But the database is still too small. More primary research has to be done to develop a thorough basis for such a system.

¹⁰ Westing, A. H., *Environmental Approaches to Regional Security*, in: Westing, A. H. (ed.), *Comprehensive Security for the Baltic: An Environmental Approach*, International Peace Research Institute, Oslo, UN Environment Program, SAGE Publications, London, 1989, p. 2.

Kazakhstan (Southern parts), is also parity to the same ecological problems. Therefore, Kazakhstan should also be part of the region of Central Asia as used in this paper as an ecogeographical region.¹¹

B. DESCRIPTION OF THE FIELD OF EXAMINATION - THEORETICAL ASPECTS, ASSUMPTIONS AND METHODOLOGY

1. Dimensions of Relationship between Ecology and Security

Two major dimensions of relationship between ecology and security can be distinguished because of different causal connections (See Figure 5).¹²

Military activities should ensure security and can cause ecological transformation and initiate ecological consequences for living conditions, especially during wartime. Ecological transformation induced by human activities and its ecological consequences, can cause security related problems (Chapter II, Section B, Subsection 3, describes the relationship between ecological degradation/scarcities and conflict). Scarcity of natural resources and environmental degradation can lead to conflicts.¹³

In this study only the security consequences of environmental problems caused by human activities (not military) are considered. For example, the Kola Peninsula is a graveyard from the Cold War and a dump for Russian submarine-based nuclear weapons. This is a pollution problem related to military activities which will not be discussed and is outside the subject of the study.¹⁴ Also not a subject of this study are military related nuclear testing and its

¹¹ Rumer, B. Z., Soviet Central Asia. "A Tragic Experiment", Unwin Hyman, London, 1989, pp. xvi-xvii, 19-20.

¹² Bächler, G., Ökologie und Sicherheit, in: Forschungsstelle für Sicherheitspolitik und Konfliktanalyse ETH Zürich (ed.), ETH-Bulletin zur schweizerischen Sicherheitspolitik, Zürich, 1991, pp. 84-86. - Ecologic-Centre for International and European Environmental Research, Potsdam Institute for Climate Impact Research, Berlin, (ed.), NATO CCMS Pilot Study, Environment and Security in an International Context, State of the Art and Perspectives, Interim Report, October, 1996, p. 8.

¹³ Ecologic-Centre for International and European Environmental Research, Potsdam Institute for Climate Impact Research, Berlin, (ed.), NATO CCMS Pilot Study, Environment and Security in an International Context, State of the Art and Perspectives, Interim Report, October, 1996, p. 7.

¹⁴ Bjerke, S., The Environment and Security in the North Atlantic Region (speech at a conference, published on the internet), Reykjavik, 7 September 1995, p. 2. - see also: Reich, D. Cleaning up Their Act, in: The World,

consequences. These aspects were often studied in the past. Additionally, the use of ecological changes as a weapon is not the object of this study. For example, the ecological terrorism or defoliation that was done in Vietnam. Also not addressed the implications for the military of environmental degradation and scarcities. Possible future tasking of the military with regard to environmental aspects is not addressed. Nevertheless, the armed forces can take many non-traditional roles.¹⁵

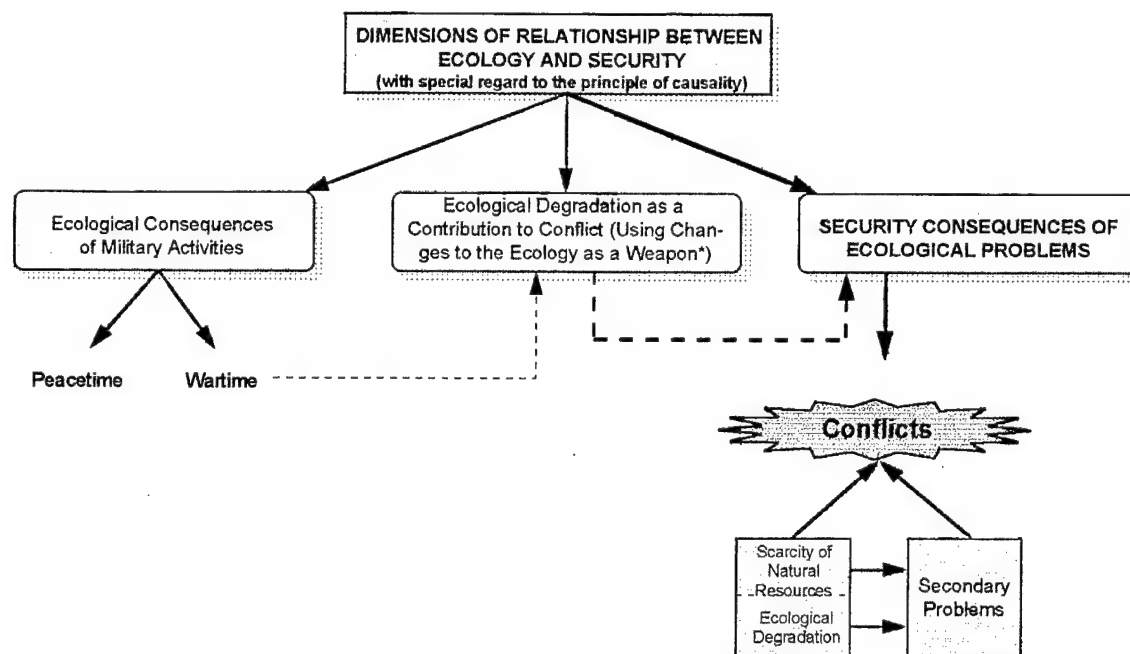


Figure 5. Dimensions of Relationship between Ecology and Security

March/April, 1995, pp. 14-23; US General Accounting Office (ed.), Report to Congressional Request, Environment, DoD's New Environmental Security Strategy faces Barriers, Washington, September, 1994.

¹⁵ In contrast to traditional military roles the Armed Forces may also involved in counteracting environmental sources of threat, for instance, cleanup at home and abroad because of military activities, to fight eco-terrorism, and the use of military expertise connected to the realization of preventive measures, e.g. airborne and space-based reconnaissance platforms providing support in fighting global warming and climate change, See: Ambassador Rodney Kennedy-Minott, Environmental Degradation as a National Security Problem: The Navy, Naval Postgraduate School, Monterey, CA, pp. 9-17.

2. Differentiation of Ecologically Induced Causes for Conflicts

In general ecological degradation and scarcity of natural resources can be distinguished as causes for conflict (See Figure 6). Ecological degradation can be induced by non-human and human caused changes. Non-human induced changes may be natural catastrophes. For example, the case in Africa where Zambia and Zimbabwe clashed over the question of controlling rampaging elephant herds.¹⁶

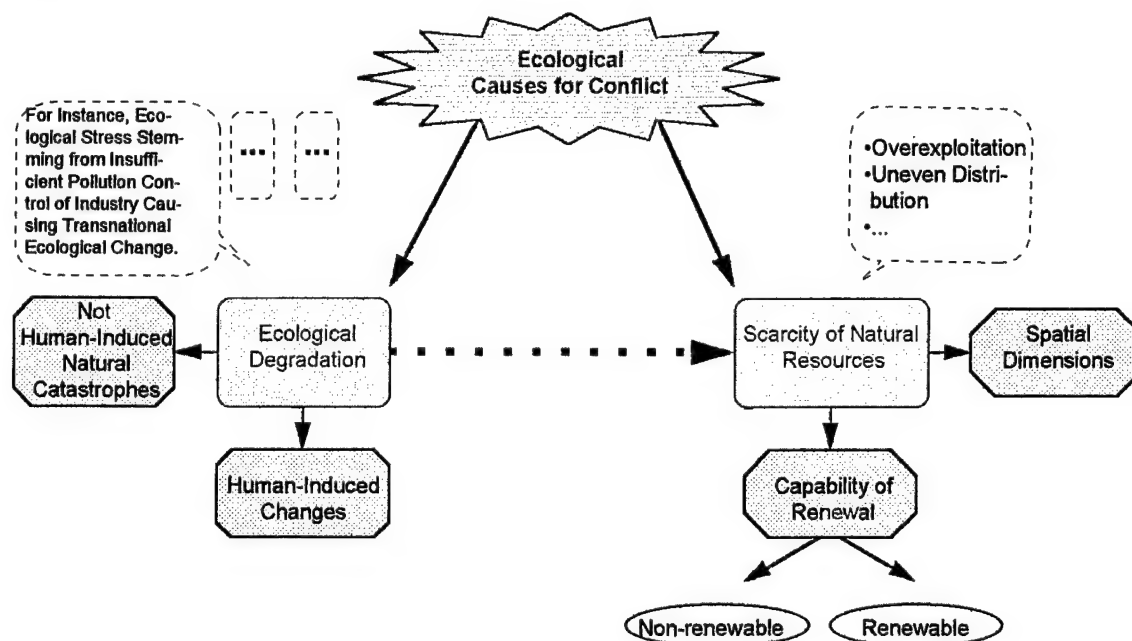


Figure 6. Ecological Causes for Conflict

This study will focus on harmful ecological transformation induced by human activities. Ecological transformations induced by human activities are reaching a disastrous extent. Ecological transformations are at the point where it seems to be necessary to place stress on this element of ecological changes.

Natural resources should be divided with regard to the spatial dimensions and the ability of renewal. The study will distinguish renewable and non-renewable natural resources.¹⁷

¹⁶ Ambassador Rodney Kennedy-Minott, *Environmental Degradation as a National Security Problem: The Navy*, Naval Postgraduate School, Monterey, CA, p. 4.

¹⁷ Westing, A. H., *The Environmental Component of Comprehensive Security*, *Bulletin of Peace Proposals*, Vol. 20, No. 2, 1989, p. 130.

..., global mechanisms for distributing or for managing resources are not effective enough to prevent local catastrophic failures or to prevent the consumption of some crucial renewable resources at greater-than-replacement rates.¹⁸ (e.g. tropical forests, fish stocks, clean water)

Resources are becoming increasingly scarce through "normal" depletion or measures to restrict supplies (boycotts, embargoes, ...). Although non-renewable resources seems to be more crucial resource in actuality, nonrenewable resources are inexhaustible. It is more likely the case that renewable resources are finite. There are already substitutes and alternative technologies to replace non-renewable resources, but:

... species driven to extinction will not reappear, and eroded topsoil cannot be replaced (except over geological time). There are, thus, threshold effects for renewable resources [deforestation, disappearing genetic diversity, soil degradation, scarce water resources, depletion of fishing stocks] that belie the name given them, with unfortunate consequences for policy.¹⁹

Therefore, in this study, the renewable resources as the more interesting subject will be stressed.

In the spatial dimensions the "special interest" of this study is in international (oceans, seabed, outer space) and shared resources (fresh waters, ocean fisheries, atmosphere).²⁰ These are resources which are more probably the likely causes for conflict (For example, the international river flows in Central Asia).

The primary focus of this study is ecological degradation and specifically human-induced ecological transformation. In the following section we will look at this issue in more detail. In that section the interconnection between ecological degradation and natural resources will be shown.

¹⁸ Ullman, R. H., *Redefining Security*, in: *International Security*, Vol. 8, No. 1, 1983, p.141.

¹⁹ Mathews, J. T., *Redefining Security*, in: *Foreign Affairs*, Vol. 68, No. 2, 1989, p. 164.

²⁰ Tennberg, M., *Risky Business: Defining the Concept of Environmental Security*, in: *Cooperation and Conflict*, Vol. 30 (3), 1995, p. 245.

The ecological degradation induced by human activities, can be distinguished as transformations which are not ecologically harmful, and those which will be ecologically harmful (See Figure 7). Only the ecologically harmful activities are of interest in the context of this study. In the qualitative dimension, ecological degradation induced by human activities can also affect the scarcity of those natural resources.

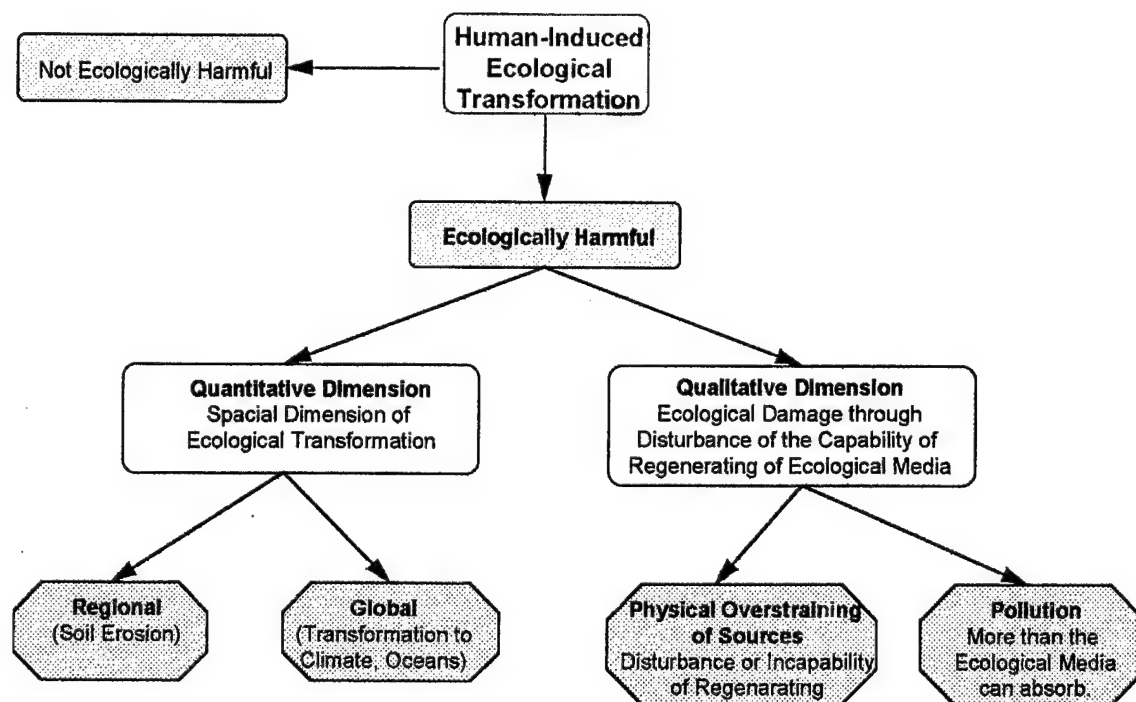


Figure 7. Distinction of Harmful Ecological Transformation Induced by Human Activities

Besides the naturally uneven distribution of resources, ecological degradation can disturb the capability to regenerate the environment. Renewable resources may be incapable of regeneration. This may be because of physical overstraining of these resources or high pollution of the environmental media (water, land, atmosphere). Environmental degradation affects the availability of resources and establish a causal connection between ecologically harmful transformation and resource scarcities.

Physical overstraining, for example, the deforestation and overgrazing and the consequence of soil erosion, result in the decline of biodiversity. Excessive irrigation, with the consequences of salinization and desertification are further examples of physical overstraining.

Pollution can affect all environmental media: water, soil, atmosphere. Causes of pollution vary. Causes of pollution in general may be nuclear pollution, chemical pollution (e.g. ozone depletion and global warming) and pollution due to increasing waste disposal. The primary focus of this study is on physical overstraining and chemical pollution of the soil, the water and the atmosphere.

3. Linkages between Ecological Degradation / Scarcities and Conflicts in a Broader Concept

If the question "What significance do harmful human-induced ecological transformations or scarcities of resources have for the causation and development of conflicts?" is posed, we must consider a broad framework for its answer. Conflict studies are regarded as an integral and comprehensive approach addressing the role of actors and the role of socio-economic and ecological factors (See Figure 8). Research of causes of war may not follow a mono-causal relationship nor a mechanistic understanding of causes and effects.

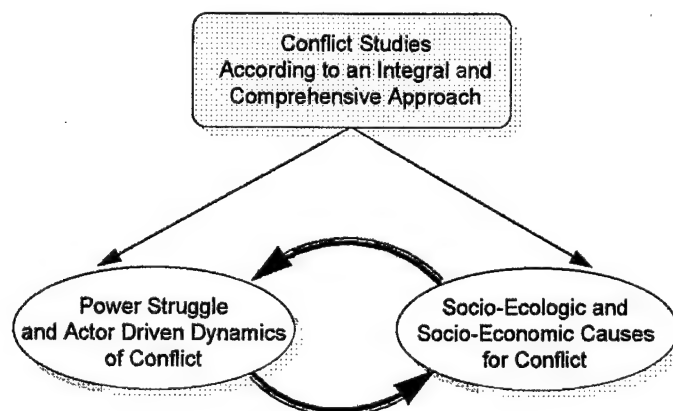


Figure 8. Conflict Studies as an Integral and Comprehensive Approach

Threat and actor should not be analytically separated. This study will focus on ecological factors as an independent variable within a case study influencing the dependent variable emergence of conflicts in a specific area (See Table 2).

Case	Independent Variable						Dependent Variable
	1	2	3	4	5	6	
Central Asia	Eco-nomic	Eco-logical	Ethnicity	Socio-Cultural	Terri-torial Claims	...	Conflicts

Table 2. Methodology - Case Study

The following aspects and questions should be analyzed:

- The existing ecologically induced conflicts in the Central Asian region in general.
- What are the determining ecological causes for conflict with regard to evolving interaction between ecology and security in Central Asia?
- What is the relationship between ecological causes for conflict and other causes for conflict in the Central Asian region?
- What is the role and significance of ecological causes for conflict with specific regard to the setting of conflicts?

After this analysis the preventive measures and the actors role in the Central Asian region as well as on a global level will be addressed. The research questions for this section are:

- Which measures can be taken to combat ecological causes of conflict and which measure are appropriate approaches for prevention and settlement of conflict in Central Asia?
- What approaches in general may lead to a comprehensive worldwide system of policy-orientated preventive measures?

This approach, on one hand identifies the socio-ecological and -economic causes for conflict and on the other hand identifies factors in the power struggle and actor that drives the dynamics of conflict. The findings of several studies of the relationship between ecological factors and conflicts, has been proven a causal connection between harmful ecological transformation induced by human activities and conflicts. These studies found that ecological transformation, in addition to other causes (risks and stress factors, ethnic aspects, population growth or economic decline and political stability) have caused numerous violent conflicts.

These assumptions are basic to this study of ecologically induced conflicts in the Central Asian region.

Homer-Dixon found that there are increased ethnic disputes due to migration, which is induced by ecological degradation. Most often ecological degradation is from his point of view, the cause for sub-national conflicts.²¹ Most often the poorest regions in the developing parts of the world are affected. The International Peace Research Institute (PRIO), Oslo, concluded:

The environment often serves as a background variable that indirectly influences or intensifies an already existing and often more comprehensive conflict situation.²²

Empirical Research has shown that linkages exist between environmental degradation and conflict; but establishing one causal element in a conflict situation, e.g. the environment, does not preclude other elements from being equally important.²³

The complexity of this theme is visualized in Figure 9. Every factor (e.g., territorial claims) by itself establish causes for conflict. Also factors can be induced, influenced or enforced by other factors especially by new types of threat (e.g., large scale migration, induced by ecological degradation, population growth or a further factor, the economy). Population growth is an important factor and will be discussed again and again.²⁴ Ecological degradation and

²¹ Homer-Dixon, T. F., Boutwell, J. H., Rathjens, G. W., *Environmental Change and Violent Conflict*, in: *Scientific American*, February, 1993, pp. 38-45.

²² Dokken, K., Graaeger, N., *The Concept of Environmental Security - Political Slogan or Analytical Tool?* Report prepared for the Royal Ministry of Foreign Affairs, PRIO, Oslo, 1995, p. 39, cited from: Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung, Abschlußbericht des Environment and Conflicts Project ENCOP*, Vol. I, Verlag Rüegger AG, Chur/Zürich 1996, p. 13.

²³ *Ibid.*, p. 43.

²⁴ Population growth and the relationship linking population levels and the resource base is complex. "By 2025 the working-age population in developing countries alone will be larger than the world's current total population. For many developing countries, continued growth at current rates means that available capital is swallowed up in meeting the daily needs of people, rather than invested in resource conservation and job creation. Such policies inescapably lay the foundations of a bleak future." Mathews, J. T., *Redefining Security*, in: *Foreign Affairs*, Vol. 68, No. 2, 1989, p. 164. Economic growth doubling or quintupled 2050, demand for energy could not keep pace with doubling of world population, expected rate of species loss would have risen from may be a few each day to several hundred a day, pollution and toxic waste burden would probably unmanageable, tropical forest would have largely disappear, arable land would be rapidly decreasing due to soil degradation. See: Mathews, J. T., *Redefining Security*, in: *Foreign Affairs*, Vol. 68, No. 2, 1989, pp. 171-172.

population growth are tightly connected, especially in developing countries. Population growth can lead to ecological degradation and may induce indirectly secondary problems which establish causes for conflicts. In developing countries, population growth can create harmful ecological transformation induced by human activities.

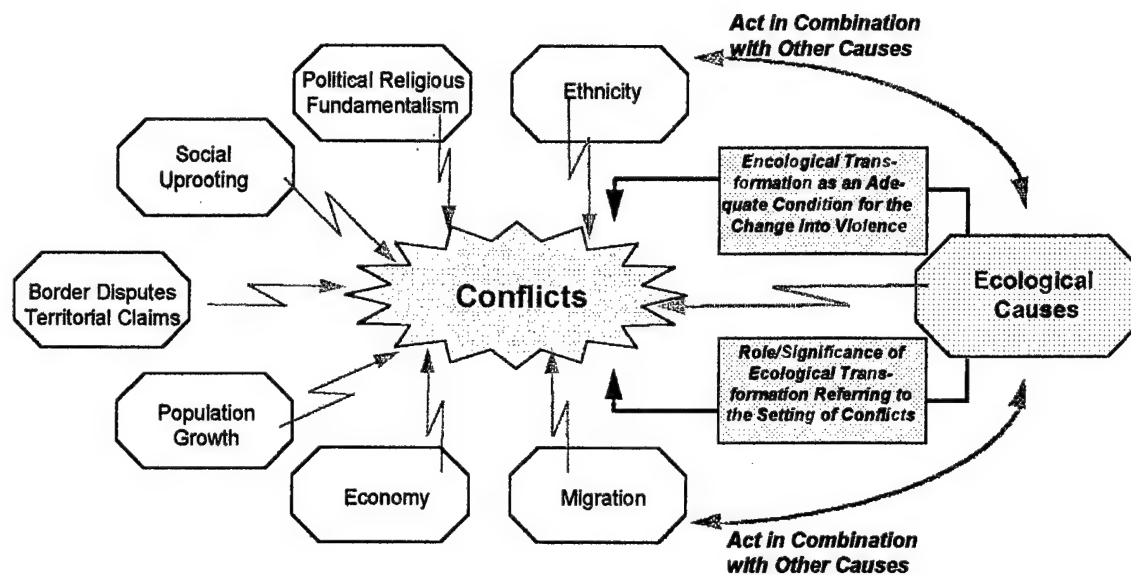


Figure 9. Interrelation between Ecological and Non-Ecological Causes for Conflict

Although the economy, population growth and the behavior of consumption are very important in a long term view, they cannot be addressed in this examination. However, these are very important aspects in the development of a global strategy to combat harmful consequences of ecological degradation and resource scarcities. These are aspects that have to be addressed, but decreasing the population growth and changing the behavior of consumption and the attitude to economic growth are such complex themes that they require separate examination. In this study they could only be examined superficially. Nevertheless, increasing population growth contributes to the problems, and can hinder ecological solutions.

The potential causal pathways leading from environmental degradation and scarcities of natural resources to violent conflict are presented and systematized

in [the following] figure..., taking into account the influence of framework conditions.²⁵

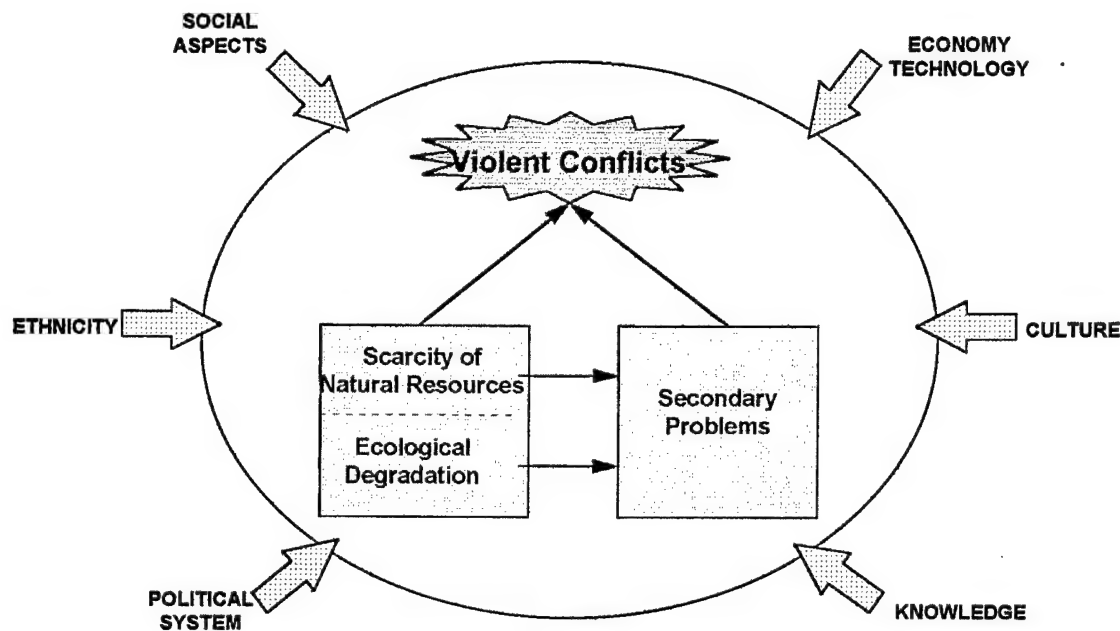


Figure 10. Causal Pathways of Ecologically Induced Conflicts and Framework Conditions

Ecologically induced conflicts arise within the broader network of the relation between man and environment. Scarcity of natural resources and uneven distribution can lead directly to conflicts or to secondary problems. Most often, ecological degradation will induce secondary problems, which can contribute to other causes for conflict, as well as trigger conflicts. Environmental degradation is most often an indirect cause for conflict. It is also important to understand that the pathways do not always follow one-way-relationships. They may also produce feedback in the opposite direction. Figure 11 gives a rough impression of secondary problems and how these secondary problems contribute to conflicts.

²⁵ Ecologic-Centre for International and European Environmental Research, Potsdam Institute for Climate Impact Research, Berlin, (ed.), NATO CCMS Pilot Study, Environment and Security in an International Context, State of the Art and Perspectives, Interim Report, October, 1996, p. 8.

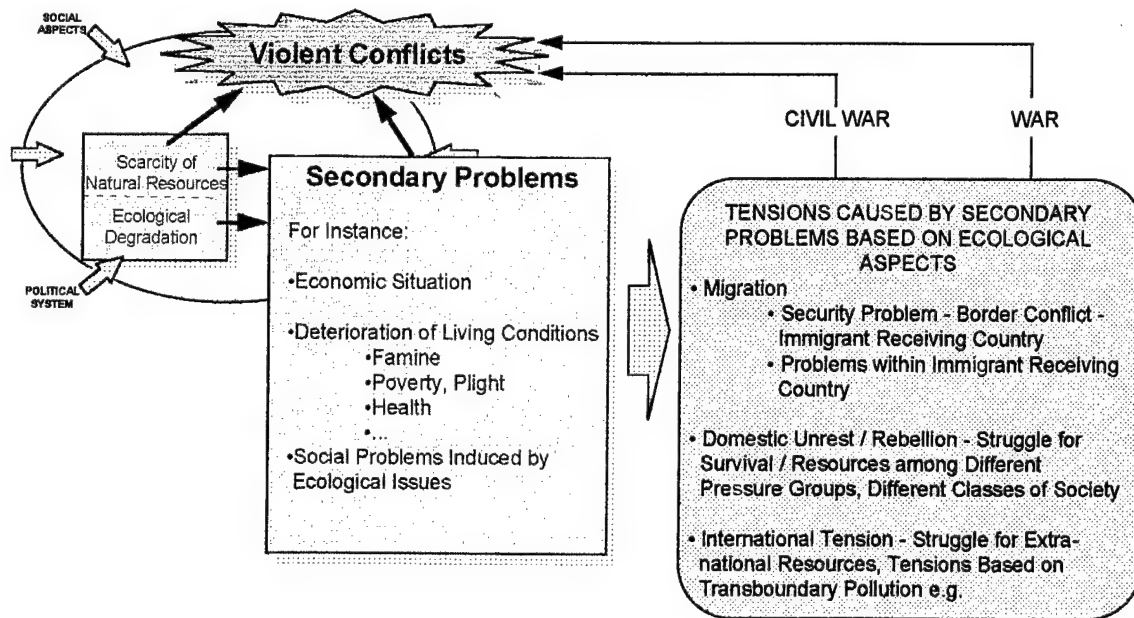


Figure 11. Role of Secondary Problems in Causing Ecologically Induced Conflicts

III. THE INCREASING SIGNIFICANCE OF ECOLOGICAL ASPECTS RELATED TO THE FIELD OF SECURITY IN GENERAL

A. DEVELOPMENTAL STAGES

The United Nations Conference on the Human Environment was the starting point for the evolving relationship between ecological damage, security and war. The discussion was dominated by the use of the environment for warfare and the effects on the environment caused by war. After this conference, the decade of the seventies was dominated by the oil crisis and the aggravating situation between the East and the West. The significance of an international ecological policy was recognized only to a limited extent.

The ecological discussion during that time focused primarily on the scarcity of non-renewable resources (Club of Rome, Meadows Study). The problems of sustainability and capability for the regeneration of renewable and life-sustaining ecological media (water, air, soil) were not widely discussed. In 1987 the Brundtland-Report²⁶ recognized the increasing significance of ecologically induced causes for conflict in the national security of states. Examples from developing countries were used to show the relationship between ecological threat, political unrest and international tensions. This report had a significant impact enhancing the study of harmful ecological transformation as a cause for conflict. For the first time the expression "sustainable development" was used and became popular.²⁷

After this report many programs and projects were launched, examining the relationship between ecology and security.²⁸ For example, UNEP and the Peace Research Institute in Oslo agreed to a project of "Studies in Environmental Security" in 1988. The

²⁶ The World Commission on Environment and Development (ed.), *Our Common Future*, Oxford University Press, Oxford, New York, 1987.

²⁷ Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung*, Abschlußbericht des Environment and Conflicts Project ENCOP, Band I, Verlag Rüegger AG, Chur/Zürich 1996, pp. 3, 12.

²⁸ See: Woodrow Wilson Center (ed.), *Environmental Change and Security Project*, (published on the Internet) - IPRA "Commission on Ecological Security"

University of Toronto and the American Academy of Arts and Science started different projects ("Environmental Change and Acute Conflict", 1990, and "Environment, Population and Security", 1994²⁹). "Environment and Conflicts Project (ENCOP)"³⁰ was a jointly run project by the Center for Security Studies and Conflict Research and the Swiss Peace Foundation in Switzerland. The project began in 1992 to deal with the causal relationship between human-made environmental degradation, and international and internal conflicts. Least is a NATO Pilot Study "Environment and Security in an International Context" in 1995.³¹ Furthermore, international conferences such as the United Nations Conference on Environment and Development in Rio, in 1992 ("Agenda 21"), contributed to the development of the subject.

Many countries became increasingly aware of the new dimension of threat caused by harmful ecological transformation. One indicator is the continuing debate about the review and extension of security. This will be considered later as a kind of multiplier for an increasing awareness of the need for preventive measures³².

In the United States ecological challenges have been part of the U.S. National Security Strategy since the beginning of the 90s. A directorate dealing with "Global Environmental Affairs" within the National Security Council was created. The position of Deputy Under Secretary of Defense (Environmental Security) was established within the Department of Defense.³³ Additionally the "Strategic Environmental Research and Development Program", initiated by the U.S. Congress, and the realization of a Defense Environmental Network &

²⁹ See: The Project on Environment, Population and Security (published on the Internet)

³⁰ See: Center for Security Studies and Conflict Research at the Swiss Federal Institute of Technology Zurich (ETHZ), Swiss Peace Foundation (ed.), ENCOP-Environment and Conflicts Project, <http://www.fsk.ethz.ch/encop/encop.html>, update December 17, 1996.

³¹ See: NATO-ECHS Web Site, Environment and Security in an International Context, <http://ech.s.ida.org/s04/s04.html>, update June 26, 1996.

³² See: Review of the Term Security - Extension of Security, p. 73.

³³ Reich, D., Cleaning up Their Act, in: The World, March/April, 1995, p. 15.

Information Exchange (DENIX) was created.³⁴ An environmental task force is further demonstration of the increasing importance of this issue.

In Germany ecological aspects have assumed an important role with regard to the field of security. Together the U.S. and Germany have a leading role in the development of the NATO Pilot Study. An increasing number of institutions are examining ecological threat as the causes for conflict and with a concern for national and international security. The 1994 White Paper on the Security of the Federal Republic of Germany and the Situation and Future of the Bundeswehr addressed:

Environmental pollution caused by man is developing into a global threat to the natural bases of existence of all mankind. The warming of the biosphere, air pollution and nuclear contamination such as that caused by Chernobyl threaten large and densely populated areas of the world. The consequence could be migration waves of undreamed dimensions.

In the Asian-Pacific region, in particular, industrialization and population growth are resulting in a high level of environmental pollution with a considerable local, regional and global impact. Growing energy requirements, which are met by using largely obsolete technologies and on the basis of fossil fuels, are leading to a rise in gas emissions, thereby aggravating the greenhouse effect.³⁵

All the above mentioned programs and projects are involved in the examination of harmful ecological transformation as a cause for conflict and security concern. But there are also critics referring to this kind of research. One of these critics is M. A. Levy:

I [Levy] argue, however, that to conclude that we need more research on environmental causes on conflict "per se" is wrong. The reason we do not know much about the role of the environment in sparking regional conflict is not that we have neglected the environment. On the contrary, few good studies of regional conflict neglect natural resources as central factors. Rather, we do not much know about the role of the environment in causing conflict because we do not know much about what causes regional conflict overall. What we

³⁴ See: Defense Environmental Network & Information Exchange (DENIX), DENIX on the Web, (published on the Internet).

³⁵ Federal Ministry of Defense, White Paper on the Security of the Federal Republic of Germany and the Situation and Future of the Bundeswehr, Bonn, 1994, p. 33.

need, if we wish to come to grips with any 'coming anarchy', is research on conflict, not on the environment.³⁶

Of course, examining these complex issues of conflict require certain methods. The demand for research on conflict according to Levy is debatable. Is not harmful ecological transformation in addition to huge numbers of other risks a cause for conflict? And, is not research on a cause for conflict a part of research of the whole complex conflict issue? This author believes that this kind of "bottom up"-approach should be accepted in the same way as the obviously more preferred "top down"-approach by Levy. If all threats such as ethnic issues, population growth or religious fundamentalism are examined it would be simpler to understand regional conflicts. This would more quickly detect the potential for conflict.

B. OVERVIEW ABOUT ECOLOGICAL SOURCES OF THREAT

Ecological transformation can be a source of threat. Some ecological degradation show a "time delay" in their causal connection between causation and the effects, for example, ozone depletion. CFC's may cause damage to the ozone layer as much as ten years after their release into the stratosphere (See Figure 12). This aggravates the danger of these threats. Furthermore, increasing scarcities of important renewable natural resources due to overexploitation or overstraining lead to a greater potential of causes for conflict. The results of global ecological transformation induced by human activities is unprecedented expansions in terms of space and time, which may reach the limits of the Earth.

The world is consuming natural resources faster than they can be renewed and still lacks 'the necessary sense of urgency' to pull the planet away from an 'environmental precipice,' a UN report warns. The United Nations Environment Program (UNEP) says that poverty, population growth and inefficient resource use, as well as wasteful consumption in rich countries, are all equally factors in the world's unsustainable development.³⁷

³⁶ Levy, M. A., Is the Environment a National Security Issue?, in: International Security, Vol. 20, No. 2, (partially published on the Internet), p. 1-2.

³⁷ Boulton, L. (The Financial Times), U.N. warns on use of resources, in: The Monterey County Herald, day of publication unknown, 1997, p. A1.

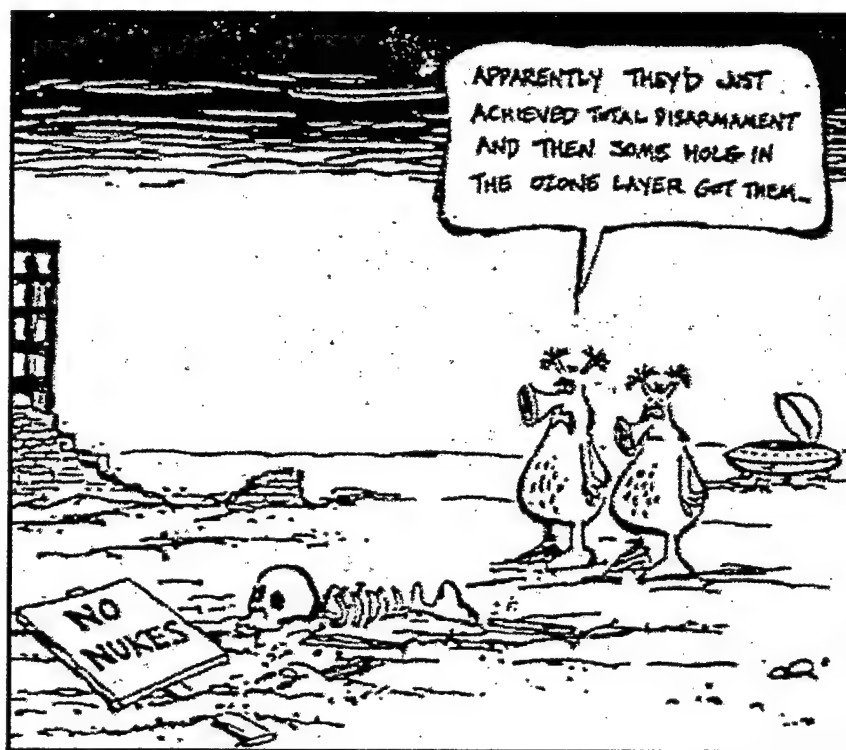


Figure 12. Ecological Sources of Threat
(Leahy, The Courier Mail, Australia, S&W Syndicate)

In the following discussion some different aspects of ecological degradation are addressed.³⁸

The discovery of the Antarctic ozone hole in the mid-1980s was one of the most spectacular events and showed dramatically the world's ecological vulnerability. Ozone depletion became an important issue and proved evidence of the instability of the ecological system to transformations induced by human activities. The atmosphere and the climate are also affected by global warming and acid rain.³⁹

... there is no doubt that the Earth's climate will change. It is not a question of will it change, it is a question of when, by how much, and where.... It has already begun to change significantly That rate of increase 2 - 8 degrees Fahrenheit by 2100 is a rate unseen on the planet for at least the last 10,000 years, since the end of the last ice age. There are clearly profound implications (how global warming will affect us) at the regional level for food security,

³⁸ Mathews, J. T., Redefining Security, in: Foreign Affairs, Vol. 68, No. 2, 1989, pp. 168-171.

³⁹ Tennberg, M., Risky Business: Defining the Concept of Environmental Security, in: Cooperation and Conflict, Vol. 30 (3), 1995, p. 247.

water supplies, natural ecosystems, loss of land due to sea level rise, and human health. This may lead to environmental refugees and further exacerbate problems with global security.⁴⁰

The effects on rising sea level may be, for instance,

...over-crowded regions like the Nile Delta and Bangladesch - developments that will prompt mass migrations and, in turn, incite group conflicts⁴¹

There may be increasing health problems in these regions because of floods and a possible growing amount of mosquitoes enhancing the danger of malaria.

Japanese are concerned with acid rain coming from China's coal dependent expanding economy. Japanese officials already are complaining about a China which will probably become the world's largest emitter of carbon dioxide (The world's 10 most polluted cities are in China). Crop yields in China are affected by high soil acidity.⁴²

Climate change and increasing temperature may create new land in the Arctic and better access to resources in the Antarctic. This may lead to struggle and conflict over land and resources.

While the local consequences of global climate change might become one of the most important threats to security in future, until today, local and regional environmental degradation, especially the erosion of arable land and grazing land has shown a particularly high potential to contribute to violent conflict.⁴³

An area the size of Austria is deforested each year, soil erosion, downstream rivers suffer siltation, causing floods and impoverishment of a huge number of people.

⁴⁰ Gore, A., The Interplay of Climate Change, Ozone Depletion, and Human Health (Remarks by Vice President Al Gore at the Conference on Human Health and Global Climate Change, National Academy of Sciences), September 11-12, 1995, p. 9. - see also: Intergovernmental Panel on Climate Change, IPCC (ed.), Climate Change 1995: Impacts, Adaptations, and Mitigation, Summary for Policymakers, Contribution of Working Group II to the Second Assessment Report, Montreal, 1995.

⁴¹ Ambassador Rodney Kennedy-Minott, Environmental Degradation as a National Security Problem: The Navy, Naval Postgraduate School, Monterey, CA, p. 5.

⁴² King, J., Gore pushes environmental protection, in: The Monterey County Herald, 24 March, 1997, p. A5.

⁴³ Ecologic-Centre for International and European Environmental Research, Potsdam Institute for Climate Impact Research, Berlin, (ed.), NATO CCMS Pilot Study, Environment and Security in an International Context, State of the Art and Perspectives, Interim Report, October, 1996, p. 15.

Some 15.4 million hectares of forest worldwide an area the size of Peru and Ecuador combined were lost during the 1980s, a rate that continues today.⁴⁴

Overcultivation, overgrazing, erosion, salinization, waterlogging because of poorly managed irrigation will lead to soil degradation. Soil degradation, desertification and salinization cause impoverishment (e.g. Haiti, Guatemala, India, Central Asia).

The land's capacity to produce is ebbing away under the pressure of rapidly growing numbers of people who do not have the wherewithal to put back into the land what they take from it. A vicious cycle of human and resource impoverishment sets in.⁴⁵

Growing populations and land scarcities may produce waves of ecological refugees migrating across borders. Soil degradation acting in combination with decreasing food production may lead to conflicts between urban workers and rural populations (e.g., Central Asian region). A world map showing the increasing soil degradation indicates a potential of conflict, especially on the West African Coast, in the Middle East, on the Indian subcontinent and along Chinese coastal areas.

Democracies will give way to authoritarian regimes prone to warfare.⁴⁶

Assuming certain conditions concerning scarce water resources, UNEP expects that:

...the number of people who would face severe water shortages would almost double from 1.5 billion in 1990 to 2.8 billion in 2050.⁴⁷

The potential for conflict related to up-stream/down-stream conflicts in the Central Asian region will be shown in this study. The vulnerability of Egypt to up-stream-riparians of the Nil river and their (e.g. Ethiopia, Sudan) environmental politics could bring about a struggle for water. Conflicts between up-/down-stream riparians over water rights and upstream

⁴⁴ UN Department of Public Information (ed.), *The United Nations: Protecting the Global Environment*, DP1/1814 (published on the Internet), April, 1996, p. 2.

⁴⁵ Mathews, J. T., *Redefining Security*, in: *Foreign Affairs*, Vol. 68, No. 2, 1989, pp. 167.

⁴⁶ Schick, J., *The Integration of Environmental Issues into U.S. Foreign Policy*, lecture given at the U.S. Naval Postgraduate School, Monterey, CA, 3 April, 1997, slide 15.

⁴⁷ Boulton, L. (*The Financial Times*), U.N. warns on use of resources, in: *The Monterey County Herald*, day of publication unknown, 1997, p. A8. - Barandat, J., *Wasser, Regionaler Konfliktstoff weltweiter Bedeutung*, in: *Institut für Friedensforschung und Sicherheitspolitik an der Universität Hamburg (IFSH), Hamburger Beiträge zur Friedensforschung und Sicherheitspolitik*, Heft 96, Hamburg, November, 1995, p. 8.

pollution (e.g. Israel-Jordan, Turkey-Iraq, Hungary-Slovakia) are all prominent cases related to water resources.

Over the next decade, water issues in the region's three major river-basins - the Jordan, the Nil, and the Tigris-Euphrates - will foster either an unprecedented degree of cooperation or a combustible level of conflict.⁴⁸

Not only scarcity but also toxication in general and pollution of water, rivers as well as maritime resorts are concerns which will increasingly affect the whole world especially in developing countries.

A new and heavily debated issue, is decreasing biodiversity. Species are being lost in the tropical forests 1,000-10,000 times faster than at natural rate of extinction. Twenty percent may be lost by year 2000.

... genetic diversity is disappearing ... when biotechnology makes it possible to exploit fully this resource ...⁴⁹

Causes for conflict are emerging between the tropical countries which possess most of the biodiversity resources and the industrialized countries which are interested in using these resources in biotechnology. The debate is about access to these resources versus profit sharing and sustainability of these resources.

The sources of ecological threats show the significance of a need for a functional ecosystem for humanity.

Nature's bill is presented in many different forms: the cost of commercial fertilizer needed to replenish once naturally fertile soil; ... ; or the price of worsening pollution, once filtered from the air by vegetation. Whatever the immediate cause for concern, the value and absolute necessity for human life of functioning ecosystems is finally becoming apparent.⁵⁰

⁴⁸ Postel, S., Worldwatch Institute, Washington, D.C.; quoted from: Barandat, J., Wasser, Regionaler Konfliktstoff weltweiter Bedeutung, in: Institut für Friedensforschung und Sicherheitspolitik an der Universität Hamburg (IFSH), Hamburger Beiträge zur Friedensforschung und Sicherheitspolitik, Heft 96, Hamburg, November, 1995, p. 7.

⁴⁹ Mathews, J. T., Redefining Security, in: Foreign Affairs, Vol. 68, No. 2, 1989, p. 165.

⁵⁰ Ibid., p. 163.

For the first time in history mankind is changing the basic physiology of the earth on a large scale and at a fast pace. Global changes take place and affect the biodiversity, atmosphere, the soil, the oceans, etc.⁵¹ The problem with all is:

...the presence of unexpected synergism, that is, interactions between things which common sense would suggest would not interact with each other ...⁵²

The end of the Cold War and changes concerning weather conditions contributed to an increasing importance of global ecological issues. Environmental degradation and resource scarcities acting in combination with increasing rates of population growth can contribute to conflicts with different severity and on different levels of spatial dimensions. The following chapter will discuss such examples and prove evidence that ecological sources of threat can cause conflicts in combination with other causes for conflict.⁵³

Robert Kaplan in his article "The Coming Anarchy:"

... drew a controversial and crucial picture of the near future in the 21st century. As physical and social results of environmental degradation he mentioned overpopulation, migration, resource scarcities, increasing problem of urban waste disposition, diseases, crime, private armies and Mafia's. Kaplan expected the collapse of nation-states and the replacement of national boundaries and upcoming subnational wars.⁵⁴

⁵¹ Ibid., pp. 163-164.

⁵² Prins, G., Die sicherheitspolitischen Herausforderungen des 21. Jahrhunderts, in: NATO Brief, Januar, 1997, p. 30.

⁵³ Schick, J., The Integration of Environmental Issues into U.S. Foreign Policy, lecture given at the U.S. Naval Postgraduate School, Monterey, CA, 3 April, 1997.

⁵⁴ Quoted from: Schick, J., The Integration of Environmental Issues into U.S. Foreign Policy, lecture given at the U.S. Naval Postgraduate School, Monterey, CA, 3 April, 1997. - Kaplan, R. D., The Coming Anarchy, How Scarcity, Crime, Overpopulation, Tribalism, and Disease Are Rapidly Destroying the Social Fabric of Our Planet, in: The Atlantic Monthly, February, 1994.

IV. THE INCREASING SIGNIFICANCE OF ECOLOGICAL ASPECTS WITH REGARD TO THE FIELD OF SECURITY IN CENTRAL ASIA

A. GEOGRAPHICAL AND ECOLOGICAL SETTING

This chapter focuses on the Central Asian region as an ecological region in accordance with the definition in Chapter II. The expression Aral Sea basin will be used as a synonym for this Central Asian region (See Figure 13). Significant ecologically caused conflicts in Central Asia are primarily the result of the so called Aral Sea syndrome.⁵⁵ This syndrome is based on a few factors most closely connected with water shortages and degradation of soils. Ecological degradation concerning the atmosphere is of lesser importance but also has a effect on living conditions.

The deterioration of soil, water and atmosphere for instance around the industrial centers of Kazakhstan and the ecological effects of space travel activities in Baikonur will not be considered because these areas are not a part of the examined ecoregion. Ecological consequences and causes for conflict regarding the nuclear testing facility in Semipalatinsk and Lop Nor⁵⁶ in China just beyond the border to Kazakhstan, will not be part of this study for the same reason.⁵⁷ This thesis does not deal with nuclear pollution and its effects and does not consider ecological transformation that is rooted in military activities, for example, research on biological weapons on an island in the Aral Sea and its consequences for the region.⁵⁸

⁵⁵ Technically low standard irrigation systems, exhaustion of water resources and loss of water for the Aral Sea led to the desiccation of the Aral Sea and the salinization and soil degradation in the entire region. These are the determining factors for the regional crisis and the so called Aral Sea syndrome. See: Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung. Abschlußbericht des Environment and Conflicts Project ENCOP, Vol. I*, Verlag Rüegger AG, Chur/Zürich 1996, pp. 241-247.

⁵⁶ Trutanow, I., *Kasachstan: Sieben ökologische Plagen. Größte Katastrophenzone Zentralasiens*, published on the Internet, p.2. - Consequences of nuclear testing in Lop Nor brought up several disputes between China and Kazakhstan because of nuclear fallout over Kazakhstan's territory. - see also: Müller, F., *Internationale Konflikte durch Umweltgefährdung*, in: *Europa-Archiv*, Folge 16, 1993, pp. 477-478.

⁵⁷ See: *Differentiation of Ecologically Induced Causes for Conflicts*, p. 12.

⁵⁸ Müller, F., *Internationale Konflikte durch Umweltgefährdung*, in: *Europa-Archiv*, Folge 16, 1993, p. 472.



Figure 13. Central Asia⁵⁹

The Aral Sea basin is dominated by large sandy deserts: Kara Kum in Turkmenistan, Kysyl Kum between important rivers Amu Darya and Syr Darya and, Ustyurt Plateau between the Caspian Sea and the Aral Sea. Tian Shan and Pamir, are huge mountain ranges, form the Southern and Eastern borders of the region. The region encompasses about 1,8 million km², almost one fifth of the area of the U.S. Five sixth of the Aral Sea basin is part of the former Soviet republics, one sixth are part of Iran and Afghanistan. The portion outside of the former Soviet republics will not be considered because ecologically induced causes for conflict are not expected in these area.

The Aral Sea basin has a continental climate: short, cold winters and very dry hot summers, with high rates of evaporation. The region is part of the arid and semi-arid vegetation zones, with the availability of precipitation varying widely. There is low precipitation in the plains and the South-Eastern foothills and high precipitation in the mountain regions of Pamir

⁵⁹ Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), *Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern*, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 254.

and Tian Shan. These mountain ranges provide the Aral Sea basin with water. The Aral Sea basin is a closed drainage system, completely separated from the world's oceans. Amu Darya and Syr Darya are the main rivers of the region.

Most agriculture is dependent on irrigation, because precipitation and ground water resources are insufficient. Irrigation and water distribution systems have a long history in this region of Central Asia. In former times, water was seen as precious. However, the attitude had changed, during the Soviet era. The intention of the Soviet Union was to become independent from cotton imports and to use cotton as cash crop. The production of cotton was drastically increased. Irrigated areas increased dramatically and the demand for water was enormous, three times higher than in former times.

B. ECOLOGICAL SOURCES OF THREAT AND ECOLOGICALLY CAUSED CONFLICTS AND ITS COMPLEXITY SHOWN BY SELECTED EXAMPLES

1. Significant Ecologically Induced Causes for Conflict and Conflicts in Central Asia

In all Central Asian republics there can be found cases of harmful ecological transformation induced by human activities and ecological degradation. Consequences of tremendous extent exist and have accumulated in a potential of causes for conflict. In fact these consequences have triggered existing conflicts. Figure 14 provides an overview of these consequences and the most significant ecological transformation in the region. Included are the evolving causes for conflict and different kind of conflicts.

Due to overgrazing in Kyrgyzstan most of the grazing land has deteriorated and there is an increasing erosion of the soil. After earthquakes and heavy rains, mud avalanches and buried villages have claimed many victims. Furthermore, the overuse of chemicals has led to a severe overstraining of the environment.⁶⁰

⁶⁰ Amt für Militärisches Geowesen (ed.), Kirgisistan, Aktuelle Geo-Information (AGI 95-04), Februar, 1995, p. 1-2.

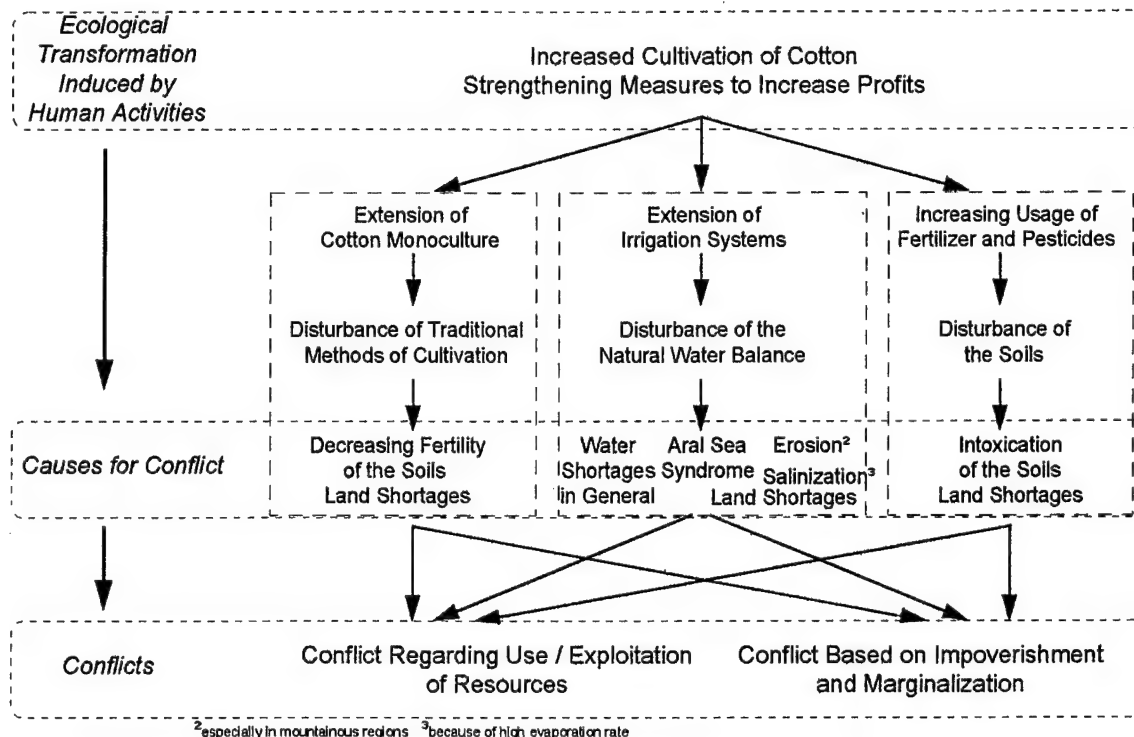


Figure 14. Developmental Stages of Ecologically Induced Conflicts in Central Asia

In Uzbekistan, the increased irrigation for the cotton monoculture has decreased the tributary river flow to the Aral Sea. This has led to a shrinking water surface with disastrous ecological damage. The most concerned areas are parts of Southern Kazakhstan and the autonomous Republic Karakpakia within Uzbekistan. Water pollution and water shortages are the primary ecological problems which contribute to causes for conflict. Because the agreements are not yet legally binding, the inter-republican water distribution is not yet settled.⁶¹

Although the cotton monoculture in Tajikistan is not as extensive as in Uzbekistan, significant damage to the natural water and soil balance has occurred. Almost all cultivated land must be irrigated. This has led to the same consequences as in Uzbekistan. The excessive use of chemicals over a long period affects human health enormously.⁶²

⁶¹ Amt für Militärisches Geowesen (ed.), Usbekistan, Aktuelle Geo-Information (AGI 95-05), Mai, 1995, p. 1-5.

⁶² Amt für Militärisches Geowesen (ed.), Tadschikistan, Aktuelle Geo-Information (AGI 95-03), Februar, 1995, p. 1.

Besides the ecological problems of nuclear testing and the shrinking water surfaces of the Caspian and Balkhash Sea, Kazakhstan with its Southern counter parts is subject to the Aral Sea syndrome. In this study in Kazakhstan only, the Aral Sea syndrome is the object of examination.⁶³

In Turkmenistan, 98% of the arable land is irrigated. Half of the water is taken from the Karakum Canal. Due to poor construction of this canal, about 70% of the water is seeping away and evaporates. The effects of the cotton monoculture is also water pollution. The unlimited use of pesticides and fertilizer contaminated the water. A significantly higher rate of severe diseases exist among the people of the area. Like the other new republics Turkmenistan is affected by the desiccation of the Aral Sea. However, Turkmenistan still uses one third of the normal tributary river flow of the Aral Sea for irrigation (23-25 million m³ per year). In total half of the irrigated land is already oversalted.⁶⁴

All these ecological transformations, induced by human activities can contribute to an increase in causes for conflict. Besides these aspects, other factors, for example, ethnic tensions and economic conditions can influence the situation and can spark conflicts. All these causes for conflict act in combination. Decreasing agricultural productivity, population growth, increasing vulnerabilities regarding water shortages are additional factors that contribute to tension. Table 3 provides an overview of the regional ecological conflicts in the Aral Sea basin. Some of the most important conflicts will be considered in more detail.

⁶³ Amt für Militärisches Geowesen (ed.), Kasachstan, Aktuelle Geo-Information (AGI 93-04), Juli, 1993, p. 3.

⁶⁴ Amt für Militärisches Geowesen (ed.), Turkmenistan, Aktuelle Geo-Information (DMG-AGI 93-08), November, 1993, p. 3.

Region / Location	Quantitative Dimension of Conflict	Parties Involved in Conflict	Type of Conflict	Control of sources	Causes for Conflict / Significant for Conflict Setting	Distinction of Conflict in Terms of Severity
Toktogul Dam / Reservoir 1993	International	Kyrgyzstan / Uzbekistan	Conflict about use/exploitation of resources Up-/down-stream conflict	Kyrgyzstan	water economic	Open Conflict with a tendency to an acute conflict
Karakum Cannel / Lower Amu Darya	International	Uzbekistan / Turkmenistan	Conflict about use/exploitation of resources Up-/down-stream conflict	Uzbekistan / Turkmenistan	territorial claims water economic	On international level open conflict, but on local level already violent clashes supported by mutual territorial claims.
Priaral Region	National	Central government of Uzbekistan and people of Karalpakia / Autonomous Republic of Karalpakstan	Conflict based on impoverishment and marginalization of indigenous people		sacrifice area water, land impoverishment marginalization	Open Conflict in a very early stage because of less existing proneness to conflict by the concerned parties.
Western and Southern provinces of Tajikistan - Kurgan-Tjube, Kuljab and Garm 1993	National (regional, local)	Locally different hostile kolkhoz, people from different regions	Conflict about use/exploitation of resources	Different Kolkhoz	ecologically related migration water / land impoverishment marginalization economic / political	Violent conflicts on a local level, however, significance of ecological aspects as a contribution to conflict seems to be low.
Fergana 1990	National (potentially international because of ethnic dimension and resulting demands for autonomy)	Different ethnic groups, Uzbeks, Kyrgyz people	Conflict about use/exploitation of resources	Mainly by Uzbeks	ecologically related migration. ethnic water / land economic/ethnic	Violent conflicts on a local level, acute conflict on international level because of the demand for autonomy by the Uzbek minority.
Isfara-Botkent-Conflict 1989	International	Kyrgyzstan, Tajikistan	Conflict about use/exploitation of resources Up-/down-stream conflict	Kyrgyzstan	?	?

Table 3. Overview Ecologically Induced Conflicts in Central Asia⁶⁵

⁶⁵ Blend from several sources, among others: Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung, Abschlußbericht des Environment and Conflicts Project ENCOP, Band I, Verlag Rüegger AG, Chur/Zürich 1996, p. 265.

2. Water Shortages

After the collapse of the Soviet Union and the independence of the republics, typical up-/down-stream situations and disputes over common irrigation systems and water resources, evolved within the Central Asian region.

With the collapse of the Soviet system, water allocation [for example] formerly guided by economic ministries in Moscow has become obsolete. All the responsibilities for decision-making on natural resources has been returned to the republics, and the political geography of the region has been changed. Rivers have become borders, the division into up- and downstream riparians is now politically relevant. The postulated "sovereignty over own resources" of the different republics is contradictory to the "internationalization" of the Aral hydrological basin. A subsequent solution for the newly internationalized river basins among the six affected republics has not been found.⁶⁶

Before the independence of the republics the management of water resources was administered by the central government in Moscow in an authoritative manner.

In the Soviet law system, water resources were an exclusive state property and therefore provided as a free good.⁶⁷

But even during the Soviet era the

... system with its central planning and distribution of resources merely drew a temporary mask over the problem disputes arose that carried over into armed conflict. For example, Kyrgyzstan and Tajikistan in 1989 fought what became known as the Isfara-Botkent conflict, after the Tajik government cut off the flow of water to a canal that flowed into the Botkent region of Kyrgyzstan.⁶⁸

The most important causes for conflict are the manipulation of river flows (most often Kyrgyzstan, Tajikistan versus Uzbekistan, Turkmenistan) and the suspension of former central

⁶⁶ Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), *Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern*, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 251.

⁶⁷ Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), *Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern*, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 287.

⁶⁸ Aiubov, S., Tajikistan/Uzbekistan: Relations Warming between Neighbors, in: <http://www.rferl.org/nca/features/1997/02/F.RU.970220170719.html>, p.1.

control over hydrotechnical water installations, e.g. the transfer of a part of Tajikistan water resources from joint control to the republican water ministry of Tajikistan.

a. Typical Up-/Down-Stream-Conflicts

National interests in river flows are different, e.g. demand for irrigation among the down-stream riparians and the production of hydroelectric power among the up-stream riparians. Different national interests and development strategies are the source causes for conflicts.

Measures taken by upstream countries [e.g. water storage for hydroelectric power production or deterioration of water quality] influencing the river flow diminish the possibilities of downstream countries to use the river for their development.⁶⁹

Classical up-/down-stream conflicts are typical conflicts over the use and exploitation of a resource. In addition to this kind of conflict is the significance of increasing deterioration of water quality. This is seen as a new type of conflict, but at the moment there is a low awareness of this problem.

(1) Syr Darya River. The Amu Darya and Syr Darya are the important rivers of the Aral Sea basin. The most significant conflict in the region exist between Uzbekistan and Kyrgyzstan. The conflict is over the river flow of the Syr Darya river, and the amount of water released by Kyrgyzstan. Uzbekistan has a certain demand on river flow for irrigation, but Kyrgyzstan prioritize their own interests as energy production.

Needs for irrigation often do not correspond to the needs for maximum energy use. In summer, when much water is demanded by irrigation, the water is stored in reservoirs to be released in winter time when energy demand is at a maximum.⁷⁰

⁶⁹ Falkenmark, M., et al., *Water and Society. Conflicts in Development*, Part 2, Oxford, 1980, p. 124, quoted from: Klötzli, S., *The Water and Soil Crisis in Central Asia - a Source for Future Conflicts?* in: Bächler, G., Spillmann, K. R. (eds.), *Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern*, Vol. II, Rüegger Verlag: Zürich, Chur, 1996, p. 252.

⁷⁰ Rumer, B. Z., *Soviet Central Asia. "A Tragic Experiment"*, Unwin Hyman, London, 1989, p. 77.

The Toktogul dam allows Kyrgyzstan to regulate the river flow of the Syr Darya over the seasons. On the one hand, Kyrgyzstan is faced with serious economic problems. Kyrgyzstan tried to sell hydroelectric power to Uzbekistan, as a recompense for free river flow into Uzbekistan. On the other hand, Kyrgyzstan depends on fossil energy sources from Uzbekistan. Uzbekistan did not accept the storage of water and the Kyrgyzstan's attempt to charge neighbors for water. In the winter of 1993, Kyrgyzstan was blamed for releasing too much water from the Toktogul reservoir and created a major discord. This demonstrates the ability of an upstream country to control the river flow and to create tensions with its downstream neighbors.

The conflict did not escalate or became relative because of the fact that both nations are vulnerable and depending on each other. Up-stream riparians (Kyrgyzstan and Tajikistan) depend on fossil energy sources from down-stream riparians (e.g. case of international bargaining: oil pipeline through Uzbekistan to Kyrgyzstan) and down-stream riparians (Uzbekistan and Turkmenistan) need the river flow. Only this aspect avert a more severe conflict and an escalation in this case.⁷¹

(2) Amu Darya River. This similar conflict is found between Uzbekistan and Turkmenistan along the middle and lower course of the Amu Darya river. When the Amu Darya passes Turkmenistan, Turkmenistan diverts large amounts of water to provide the Kara Kum Canal with water.⁷² This creates a significant decrease of river flow downstream when the Amu Darya river again passes through Uzbekistan territory. Turkmenistan diverts twice to threefold more water than it did during Soviet rule when quotas were established.⁷³

⁷¹ Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung. Abschlußbericht des Environment and Conflicts Project ENCOP, Vol. I, Verlag Rüegger AG, Chur/Zürich 1996, pp. 252-253.*

⁷² Barandat, J., *Wasser, Regionaler Konfliktstoff weltweiter Bedeutung*, in: Institut für Friedensforschung und Sicherheitspolitik an der Universität Hamburg (IFSH), *Hamburger Beiträge zur Friedensforschung und Sicherheitspolitik*, Heft 96, Hamburg, November, 1995, pp. 25-26.

⁷³ Klötzli, S., *The Water and Soil Crisis in Central Asia - a Source for Future Conflicts?* in: Bächler, G., Spillmann, K. R. (eds.), *Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern*, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 294.

Furthermore, Turkmenistan diverted water downstream from the Amu Darya on Uzbekistan territory to irrigate their own territory. These activities were driven by the fact that in another Turkmenistan province (Dashvouz) which depends on water from Uzbekistan is not sufficiently provided with water by Uzbekistan. Uzbekistan diverted too much water for its own use and disregarded guaranteed amounts of water for Turkmenistan. Turkmenistan is blamed for poor water management, for example, Turkmenistan uses twice as much water per capita as in Uzbekistan.

Despite agreed inter-republican quotas of water distribution, some water resources are not under joint control and are an increasing cause for conflict. In addition there are territorial claims by each country and ethnic minorities from the neighboring country. The planned drastic extension of irrigation by Turkmenistan puts an additional and significant strain on the relationship between Turkmenistan and Uzbekistan.

Smaller and locally orientated disputes between Turkmenistan and Uzbekistan take place along the lower course of the Amu Darya. These conflicts, aggravated by ethnic problems, may escalate and evolve to create acute conflicts in future.⁷⁴ On international level these disputes can be seen as an open conflict, but on the local level violent clashes have already taken place. Because of this and the expected aggravating ethnic tensions, there is a significant tendency for this conflict to become an acute conflict on international level.

Although Tajikistan and Uzbekistan recently have signed economic agreements to improve mutual relations. Key aspect of their relationship have not been settled, the water issue.

Between Tajikistan and Uzbekistan a major irritant in relations in the post independence era has been the fact that Tajikistan has signed protocols with Afghanistan and Turkmenistan on the joint use of water resources of the Amudario Basin. Some analysts attribute the souring of relations between the Tajiks and the Uzbeks to this action more than to any other factor. Uzbekistan, which is one of the main users of the Amudario Basin water resources, was shut out of the deal. As a result, there remains no official agreement on utilizing

⁷⁴ Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung*, Abschlußbericht des Environment and Conflicts Project ENCOP, Band I, Verlag Rüegger AG, Chur/Zürich 1996, pp. 254-255.

water resources between Tajikistan and Uzbekistan. In arriving at the present economic accords, the two sides agreed to avoid the dangerous currents and eddys of the water issue.⁷⁵

b. Disputes over Common Shared Irrigation Systems/Water Resources

Under Soviet rule the common irrigation systems and water resources were controlled by central institutions. The Amu Darya and the Syr Darya river basin have two joint river basin agencies, called BVO⁷⁶, that were established in 1988. These agencies should improve the control over the hydrotechnical installations (mainly reservoirs) and remove conflict emerging from disputes over river flows and quotas⁷⁷.

After independence of new republics conflict developed concerning the control of the water distribution. Although the new states retain the BVO, a portion of the water resources were suspended from joint control. For example, 60% of the river flow in the Amu Darya basin is controlled by the BVO, the remaining flow is under the control of the national water ministries. This creates inefficiency in the productivity and the responsibilities of the BVO.

The most notable case regarding the suspension of joint control took place in Tajikistan. A vehement debate was created when control of jointly administrated water reservoirs was handed over to the water ministry of Tajikistan. Like Kyrgyzstan, Tajikistan would be able to exploit hydropower resources and manipulate the river flows, e.g. with the Rogun dam on the river Vakhsh, a main tributary to the Amu Darya.

This concerns both Uzbekistan and Turkmenistan greatly, and has the potential to create a conflict. Although activities which contribute to conflict between Uzbekistan and Tajikistan have not appeared, Uzbekistan has attempted to interfere in Tajikistan politics.

⁷⁵ Aiubov, S., Tajikistan/Uzbekistan: Relations Warming between Neighbors, in: <http://www.rferl.org/nca/features/1997/02/F.RU.970220170719.html>, Dushanbe, February 20, 1997, pp.1-2.

⁷⁶ Russian abbreviation for basin water management agency

⁷⁷ The key of water distribution based on quotas set by the Soviet government. These quotas are still valid and part of today's water management.

Uzbekistan intends to stabilize the situation in Tajikistan, and wants to ensure the control over hydrotechnical installations and water reservoirs is not misused at the expense of Uzbekistan.⁷⁸

3. Degradation of Soils

a. *Causes of Degradation of Soils and Consequences*

Increasing mechanization in agriculture, the transformation of arable land into monoculture, increasing use of fertilizer and pesticide, poor technical water management of irrigation systems and the overexploitation of soils, aggravate the soil crisis within the Central Asian region. The soil crisis is tightly connected with the increasing scarcity of water resources. Irrigation has led to salinization of the soil.⁷⁹ The disastrous economic principle of the planned economy that one must surpass the "attained level" have made the soil crisis much worse. In Uzbekistan, saline soil makes up almost the half of the total arable land.

A further aspect of soil degradation is soil erosion, caused by the extension of irrigated land and overgrazing. Vegetation cover is damaged by overgrazing and creates subsequently higher soil erosion. In mountain areas erosion often occurs because of poorly maintained irrigation systems. Almost half of agricultural land in Kyrgyzstan is affected by erosion. All these are aspects of a dramatic process of desertification and indicate severe soil crisis.

⁷⁸ Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung*, Abschlußbericht des Environment and Conflicts Project ENCOP, Vol. I, Verlag Rüegger AG, Chur/Zürich 1996, p. 254. - Klötzli, S., *The Water and Soil Crisis in Central Asia - a Source for Future Conflicts?* in: Bächler, G., Spillmann, K. R. (eds.), *Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern*, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 293.

⁷⁹ "... excessive exploitation of the soil - by ignoring proper crop rotations, by making excessive use of harvesters, and by overusing pesticides - finally began to take its toll.... the condition of the soil in Uzbekistan is comparable to that of a gravely ill person. The cause, ..., is the transformation of cotton into a monoculture. Thus, cotton has been cultivated on many fields, without interruption, for some 50 years; that has exhausted the nutrients in the soil. Tractors cross a field up to 30 times a year. Cotton-machines mercilessly compress the soil, destroying its microorganisms. And because cotton has a low immunity to disease and infestation, massive quantities of pesticides are used, killing every living thing in the fields [and polluting the drainage water flowing back to the rivers. The storage of fertilizers and chemicals in bad conditions is an additional danger for water and soil toxic contamination]. Norms of crop rotation have also been violated; ..." (Rumer, B. Z., *Soviet Central Asia. "A Tragic Experiment"*, Unwin Hyman, London, 1989, p. 70.)

b. Fergana Valley - Correlation of Ecological and Economic/Ethnic Factors

In many areas of Kyrgyzstan there is migration from rural to urban areas and fertile areas like the Fergana Valley. Besides population growth and increasing impoverishment of the rural areas, there are also ecological factors which create this migration. In the past the Kyrgyzstan's economy was dominated by extensive cattle breeding. Obviously overgrazing was not a severe problem during the Soviet era because consistent recultivation of grazing lands was accomplished. After the independence of the republics these measures were stopped.⁸⁰ Most of the cattle were slaughtered after independence. Whether this was done because of the decrease in grazing lands or the intention to acquire quick wealth is not known. But it seems that people have experienced land shortages because of the lack of recultivation and increasing population growth. This means that migration was at least partially caused by these ecological factors. An additional factor is the increasing soil erosion in the rural mountainous areas. Because of all these factors, the migration of Kyrgyz people from mountainous areas to urban areas, for example the Fergana valley, increased.

In the Fergana Valley the migrating people are confronted with social uprooting, new economic systems and a lower standard of living than the settled Uzbek minority (See Figure 15). Increasing rates of unemployment, especially in the region of Osh in the Fergana Valley (e.g. 35 %) led to the migrants of social fringe groups. Socio- economic aspects and ethnic differences created tensions which contributed to a build up in aggressive potential.

The Fergana Valley ... is one of the most ethnic mixed regions of Central Asia. All countries making up parts of the valley have territorial claims against each other mainly because of large minorities living in districts bordering their own republic. As far as the most populous republic is concerned, around 90% of the Uzbek living in Kyrgyzstan reside mainly in the Osh district bordering the Uzbekistan part of the Fergana Valley. The strained relations between Kyrgyz and Uzbek communities in Osh are historical.... In 1990 Uzbeks and Kyrgyz people fought over land rights in ... Osh, resulting in at least 300 deaths. The immediate cause for the clashes was the official permission for a Kyrgyz

⁸⁰ Personal communication with the former German Ambassador in Kyrgyzstan, Dr. Scheller, March 13, 1997.

cooperation to use irrigated land of an Uzbek kolkhoz to build residential buildings on it.⁸¹

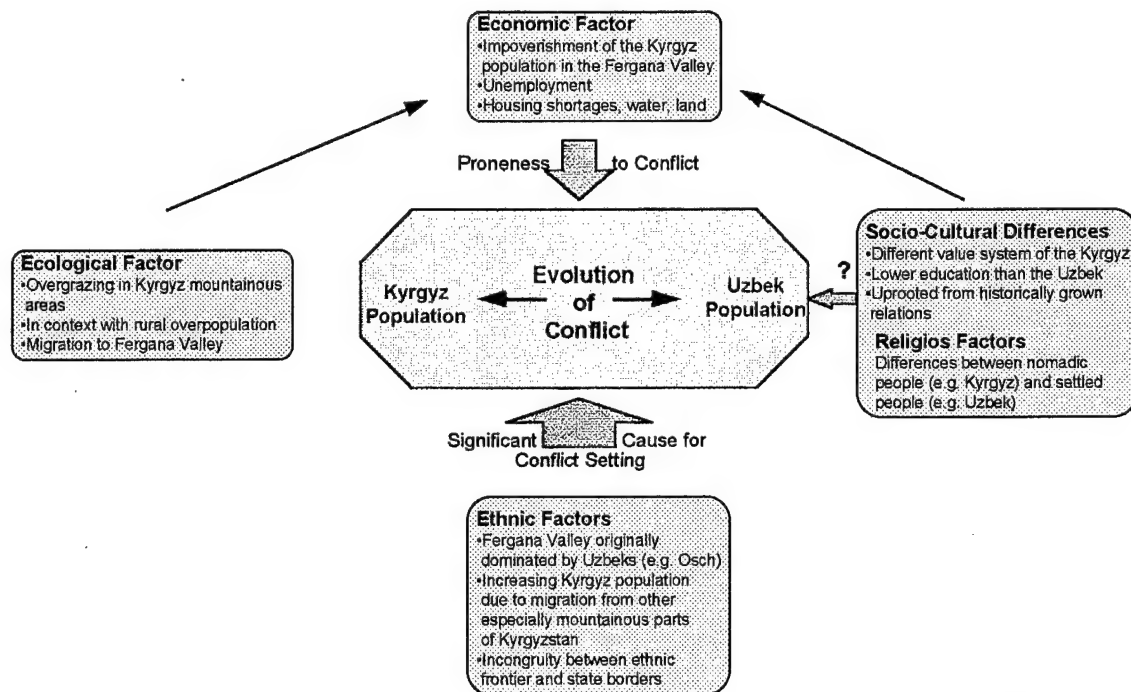


Figure 15. Interrelation and Role of Different Causes for Conflict in the Fergana Valley Conflict

In the past, the Kyrgyz in the city of Osh, were dominated by Uzbeks. Because of the migration the Kyrgyz population grew. However, the Kyrgyz feel less privileged in their own country which enforces the already existing ethnic tensions between the Uzbeks and the Kyrgyz. This case is ideal to show the interrelation between ecological and non-ecological causes for conflict and their causal connection to security and the outbreak of violent conflict.

Ecological factors (Kyrgyz who are forced to leave their rural home regions because of soil degradation and other socio-economic reasons)⁸² is the source or starting point

⁸¹ Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 295. - see also: Rupert, J., Dateline Taschkent: Post-Soviet Central Asia, in: Foreign Policy, No. 87, 1992, p. 181.

for conflict. Socio-economic and political factors in the Osh area (impoverishment of the migrants, deterioration of social status, change in structures of political power in favor of the Kyrgyz), accompanied by ethnic friction allow tensions to escalate.

c. Southwestern Parts of Tajikistan - Correlation of Ecological and Economic/Political Factors

The violent conflicts in Tajikistan are primarily caused by political power struggles. Political rivalries between different parts of the country and the ex-communist elite attempting to sustain their power are the roots of violent conflicts. Rivalries between different parts of the country are rooted in the so called localism, a kind of social and geographical structure of Tajik society.

It is important to mention the disparities in socio-economic development between different parts of the country. Part of the socio-economic differences depend on ecological degradation. In the areas with the highest ecological degradation e.g. in the western and southern parts of Tajikistan clashes are significant. These areas depend on irrigation and are affected by ecological degradation, e.g. erosion and salinization, and a decrease in arable land.

An aggravating aspect is that these rural areas have the highest population growth in Central Asia (e.g. Kurgan-Tjube had the highest population growth within Central Asia until the end of the 80's). Furthermore, these areas are often ethnically high mixed areas because of migration of people from poorer mountainous regions to the irrigated lands. The decrease in arable land and increasing population growth end in a struggle for land among hostile Kolkhoz, as they attempt to solve economic problems and prevent the impoverishment of their own people.

Although there is a causal connection between conflicts and ecological degradation in Tajikistan, the contribution of ecological factors to violent conflicts seem to be

⁸² Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung, Abschlußbericht des Environment and Conflicts Project ENCOP, Vol. I, Verlag Rüegger AG, Chur/Zürich 1996, pp. 257-261.*

low. A significant potential for conflict may arise when political forces misuse Tajikistans hydrotechnical installations and water reservoirs at the expense of the down stream riparians.⁸³

4. Desiccation of the Aral Sea

a. Consequences of the Desiccation of the Aral Sea in General

Cotton monoculture and its irrigation practices has led to the desiccation of the Aral Sea, one of the major human-induced ecological catastrophes in the world (See Figure 16). Once larger than West Virginia,⁸⁴ the Aral Sea has decreased 40 percent in size (1960: 67,000 km²; 1995: ca. 40,000 km²) and its level has dropped 14 meters over a thirty year period.⁸⁵ These effects were caused by overexploitation of water resources and tributary river flows to the Aral Sea. This was because of excessive irrigation especially of cotton monoculture (accelerated by dry, naturally low-flow years of the seventies and eighties).

An increase of salinity from 5 to 30 thousandth, has brought fishing to a standstill, and has created deflated toxic salts and dust from the dried seabed. Dropping of the ground water table in the river deltas and regional climate change are further consequences of the desiccation. Deflated toxic salts are already covering ca. 2 million hectare of arable land.⁸⁶ The Aral Sea received only 1/11 of the water resources the sea requires to renew itself. Even with a very optimistic maximum short-term increase in annual river inflow the sea will continue to shrink and may be able to stabilize its surface to about 19,000 km² only by 2020.

⁸³ Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), *Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern*, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 297.

⁸⁴ Edwards, M., Pollution in the former U.S.S.R., Lethal Legacy, in: *National Geographic*, Vol. 186, No. 2, August, 1994, p. 91.

⁸⁵ World Resources Institute and International Institute for Environment and Development (ed.), *World Resources 1990-91, The Dying Aral Sea*, New York, Oxford, 1990, p. 171; quoted from: Kennedy, P., *Preparing for the Twenty-First Century*, Vintage Books, New York, 1993, p. 102.

⁸⁶ Amt für Militärisches Geowesen (ed.), *Usbekistan, Aktuelle Geo-Information (AGI 95-05)*, Mai, 1995, p. 1-5.

With regard to the climate:

... the Aral Sea originally had a moderating function in the regional climate system and served as catalyst for an enforced formation of clouds because of enormous masses of vapor rising from its surface. This moisture replenish the ice and snow caps of the distant mountains, completing the regions water cycle. It is assumed that even the precipitation patterns in the mountains of Central Asia will change with a desiccated Aral Sea. The climate has become more continental with a shrinking water surface.⁸⁷

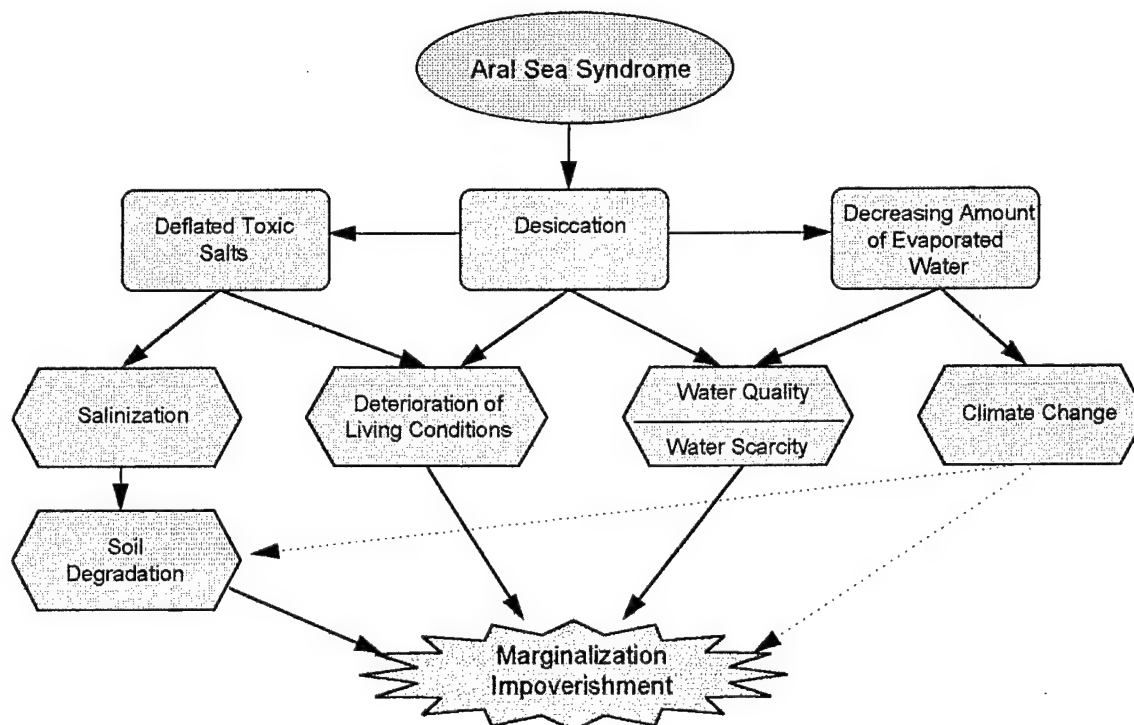


Figure 16. Dimensions of the Aral Sea Syndrome

Although the upper riparians like Tajikistan and Kyrgyzstan are concerned with the consequences of salinization due to deflation of salt, toxic dusts and probable climate

⁸⁷ Dech, S. W., Ressler, R., Die Verlandung des Aralsees. Eine Bestandsaufnahme durch Satellitenfernerkundung, in: Geographische Rundschau, No. 6, 1993, p. 351, quoted from: Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 267.

change, the awareness of the consequences is not well developed. Therefore, the willingness to react adequately to the problem and stop ecologically deteriorating activities is low.⁸⁸

b. The Priaral Region - A "Sacrificed Area" Bearing Future Causes for Conflict

The autonomous Republic of Karakalpakstan (Uzbekistan), the provinces Daschhovuz (Turkmenistan) and Kysylorda (Kazakhstan) are concerned with the desiccation of the Aral Sea. This area, called the Priaral region has been regarded as a sacrificed area since the 60's. The population bears the ecological costs, but the economic benefits are realized elsewhere. The desiccation of the Aral Sea was deliberately undertaken in favor of the cotton monoculture and its required irrigation.⁸⁹

In this region, the process of impoverishment of the people can be recognized, especially those who live from fishing.⁹⁰ This process is a source of conflict especially between the most concerned region of Karalpakia and the central government of Uzbekistan. However, the existing ecological catastrophe and the significant consequences on living conditions has not yet had an intensifying effect on conflicts. Severity of conflict did not increase in a significant manner. A reason may be that the awareness of the ecological disaster is less developed. This behavior and attitude prevent people from reacting more seriously and decisively. Furthermore, the relatively stabilized society does not promote a more severe conflict. At the moment all the concerned republics do not have a serious or vital interest in the Priaral region. Cost-benefit relations within the republics and between the republics prevent decisive measures and investments to improve living conditions.

As a matter of fact, all proposals to alleviate the water crisis in Central Asia emphasize the need to "save" the Aral Sea. However, since the problems do not affect all the republics to the same degree, determining priorities and clear financial commitments become complicated. National development plans of some countries sharing the Aral Sea basin (e.g., Turkmenistan) may be

⁸⁸ Hall, B. W., *The Tragedy of the Commons and UN Responses to Environmental Problems*, <http://www.ear/ham.edu/ear/hamcollege/polisci/environment.html>, February, 1996, p. 5.

⁸⁹ Peterson, D. J., *Troubled Lands: The Legacy of Soviet Environmental Destruction*, Boulder, 1993, pp. 8-9.

⁹⁰ *Ibid.*, p. 111.

contradictory to commitments of other countries in favor of the common resources.⁹¹

Although the severity of conflict is very low in the Priaral region, even among the most suffering people of Karalpakstan, causes for conflicts and proneness to conflict can increase. An increasing ecological consciousness among the people, increasing importance of ethnic aspects and degrading living conditions may strengthen causes for conflict within the autonomous Republic of Karalpakstan against the central government in Uzbekistan. In this regard tendencies of separation can be taken into account. A secession of Karalpakia from Uzbekistan is foreseeable in the constitution. At the moment the economic dependence on Uzbekistan prevent the build up of causes for conflict.⁹²

C. SIGNIFICANT ECOLOGICALLY RELATED EFFECTS ON HUMAN HEALTH, ECONOMY, MIGRATION

In the last chapter direct conflict-related consequences of ecological transformation were presented. In this chapter, the consequences that are not directly conflict-related, but have the capability to induce conflicts are considered. The consequences on health, migration and the economy, as secondary problems related to harmful ecological transformations, will be considered more, in detail.

The consequences of ecological degradation caused serious health problems in Central Asia. A significantly higher level of morbidity and mortality, including infant mortality can be found. Although the causal connection between the ecological degradation and other severe diseases (e.g., typhoid, hepatitis, kidney-failure, birth defects) is not yet proven, a causality seems obvious.

⁹¹ Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), *Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern*, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, pp. 300-301.

⁹² Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung. Abschlußbericht des Environment and Conflicts Project ENCOP*, Band I, Verlag Rüegger AG, Chur/Zürich 1996, pp. 256-257.

In the center ecologically catastrophic areas of Karalpakia the population is suffering high infant mortality, liver ailments and other serious illnesses caused by toxic food and polluted drinking water.⁹³ The infant mortality rate of 10% is one of the highest on earth.⁹⁴

Poor drinking water, pesticides, other chemicals and airborne toxic salts, are causing respiratory tract diseases.

Dust storms often blow for days, sweeping up tons of salts, pesticides, and fertilizers. Doctors brace then to receive children with respiratory problems. These, plus dysentery and diarrhea, figure in the high infant death rate. Another factor: the poor health of the mothers. 'Eighty percent of the mothers are anemic, so many of these kids are unhealthy from the first day,'...⁹⁵

A major part of the population in certain areas must take water from contaminated water reservoirs. The aggravating living conditions and an increasing awareness of the consequences of ecological degradation can lead to more causes for conflict (e.g. concerned people against the central government).

Most of the indigenous people are living in rural areas. The level of urbanization is rather low compared to other regions within the former Soviet Republic. The traditional rural population is characterized by immobility. The high population growth in rural areas and degradation of the soil results in greater impoverishment of the rural population. Traditional agriculture, was destroyed by expansion of the cotton monoculture, and can no longer employ the rapidly increasing young work force. The growth of agricultural land will reach its limits because of water restrictions.

Against this background migration from rural to urban areas has increased. Although large scale migration movements, due to ecological reasons are limited, the aggravating situation may strengthen the migration to urban centers, for example, the migration from mountainous areas of Kyrgyzstan and Tajikistan. This migration is for different reasons (deterioration of the economic situation, soil degradation because of overgrazing and erosion,

⁹³ Peterson, D. J., *Troubled Lands: The Legacy of Soviet Environmental Destruction*, Boulder, 1993, p. 5.

⁹⁴ Amt für Militärisches Geowesen (ed.), *Usbekistan, Aktuelle Geo-Information (AGI 95-05)*, Mai, 1995, p. 5.

⁹⁵ Edwards, M., *Pollution in the former U.S.S.R., Lethal Legacy*, in: *National Geographic*, Vol. 186, No. 2, August, 1994, p. 91.

political reasons etc.).⁹⁶ Over the long term a tendency to migration from rural to urban areas is expected. This may lead to conflicts. This can be seen in some cases already.

Because of the unstable ecological, economic and political situation and ethnic tensions members of ethnic minorities like the Russians leave the Central Asian republics. This means the new republics will suffer a decline in their skilled work force, which cannot be replaced.

Central Asia's economy is among the most specialized in the Soviet Union. In Central Asia, cotton is king. This specialization developed as a result of the region's climatic conditions and its land and water resources, which favor cotton cultivation.⁹⁷

In the mid-sixties, changes in economic policy in the Soviet Union, totally ignore regional interest (liquidation of regional economic boards, return to centralized economic administration).⁹⁸

At this time, the economic situation is primarily characterized by a less developed sector of production and one-sided alignment on agriculture. Agriculture is dominated by cotton monoculture, especially in Turkmenistan, Tajikistan and Uzbekistan. In Uzbekistan cotton dominates. Cotton is approximately 80% of the entire agriculture production.⁹⁹ A major part of the food requirements must be imported. The problematic situation of food supply is aggravated because of high population growth. In the new republics of Turkmenistan, Tajikistan, Uzbekistan and Kyrgyzstan the average annual population growth is more than two percent. The rate of population growth in Tajikistan is three percent annually.¹⁰⁰ In comparison, the population growth of the U.S. is less than one percent at this time.¹⁰¹

⁹⁶ Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung, Abschlußbericht des Environment and Conflicts Project ENCOP, Band I, Verlag Rüegger AG, Chur/Zürich 1996, pp. 246-249.*

⁹⁷ Rumer, B. Z., *Soviet Central Asia. "A Tragic Experiment"*, Unwin Hyman, London, 1989, p. 27.

⁹⁸ *Ibid.*, pp. 4-5.

⁹⁹ Amt für Militärisches Geowesen (ed.), *Usbekistan, Aktuelle Geo-Information (AGI 95-05)*, Mai, 1995, p. 2.

¹⁰⁰ Amt für Militärisches Geowesen (ed.), *Tadschikistan, Aktuelle Geo-Information (AGI 95-03)*, Februar, 1995, p. 2.

¹⁰¹ *Munzinger Archiv* (ed.), *IH-Länder aktuell, Vereinigte Staaten von Amerika*, 1994, p. 7.

The Gross National Product (GNP) is low in these republics with the exception of Turkmenistan (3370 US \$ per capita¹⁰²). Tajikistan with a GNP of 480 US \$ per capita in 1993 is according to UN one of the "Least Developed Countries" in the World.¹⁰³ At the same time the GNP in Germany was 23,650 US \$ per capita. This situation is not expected to be improved in the near future.

Up to 40 percent of the entire work force of Uzbekistan and Kyrgyzstan is employed in the agricultural area.¹⁰⁴ The sector of production is less-developed and investments must be made to provide employment for people, e.g. processing and converting cotton to textiles within Central Asia.¹⁰⁵ A decreasing amount of arable land, population growth and a high number of adolescents will aggravate the situation. This area is facing an already high rate of unemployment. Existing estimates show that the current rates of unemployment are higher than 10 percent.

High inflation rates, economic deterioration and decreasing agricultural land area often correlates directly with ecological degradation and contributes to an increasing impoverishment of society. Additionally, living conditions are increasingly deteriorated because of the increasing threats to human health. These situations may lead to aggression, which has the potential to create causes for conflict.

¹⁰² Amt für Militärisches Geowesen (ed.), Turkmenistan, Aktuelle Geo-Information (DMG-AGI 93-08), November, 1993, p. 3.

¹⁰³ Amt für Militärisches Geowesen (ed.), Tadschikistan, Aktuelle Geo-Information (AGI 95-03), Februar, 1995, p. 3.

¹⁰⁴ Amt für Militärisches Geowesen (ed.), Usbekistan, Aktuelle Geo-Information (AGI 95-05), Mai, 1995, p. 2. - Amt für Militärisches Geowesen (ed.), Kirgisistan, Aktuelle Geo-Information (AGI 95-04), Februar, 1995, p. 2.

¹⁰⁵ Rumer, B. Z., Soviet Central Asia, "A Tragic Experiment", Unwin Hyman, Boston, 1989, p. 185.

V. CURRENT SITUATION AND ACTIVITIES TO PREVENT ECOLOGICALLY INDUCED CONFLICTS IN CENTRAL ASIA

A. CURRENT SITUATION AND DEFICITS IN SOLVING THE PROBLEMS

In the last chapter, many causes for conflict related to ecological transformation induced by human activities were shown to exist. There is a necessity to take measures to combat these threats. To counteract these problems, there is a need for corroborative involvement. The region lacks cooperation and integration and this hinders the chances for an ecoregional solution. The reasons for this is very different and aspects of the problem makes the situation problematic, for example, historical, ethnic, socio-economic, nationalistic factors etc.

The Central Asian republics and their boundaries were created in an artificial manner. This creation disregarded historical, geographical and ethnic factors. In former times the region was dominated by a unified Turkestan. Tajikistan existed from 1924 until 1929 as an autonomous republic inside Uzbekistan. This aspect has its effect on today's relationship between Tajikistan and Uzbekistan. The Tajiks believe they will not be treated adequately by the Uzbeks.¹⁰⁶ Other historical backgrounds are the explanation for regional rivalries and struggle for hegemonic power.¹⁰⁷

Social and economic crises face all the new republics. Against this background there is little chance for radical change in favor of solutions to ecological problems. Furthermore, the republics have different national interests resulting from different preconditions at the time of their independence. In the near future the republics will concentrate on national development programs, for example, water management, extension of irrigated land (exasperating the water

¹⁰⁶ Aiubov, S., Tajikistan/Uzbekistan: Relations Warming between Neighbors, in: <http://www.rferl.org/nca/features/1997/02/F.RU.970220170719.html>, Dushanbe, February 20, 1997, p.1.

¹⁰⁷ Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung*, Abschlußbericht des Environment and Conflicts Project ENCOP, Vol. I, Verlag Rüegger AG, Chur/Zürich 1996, p. 266.

problem), crop diversification, optimization of hydroelectric production, increase of food production to accommodate their growing population.

These national orientated objectives may lead to conflict with the other republics, e.g. in the water issue. Proneness for conflict may increase because a lack of commonly agreed rights and responsibilities on an international level. But on the other hand:

[E]conomic inter-dependence, insufficient financial resources and general hardship associated with the post-Soviet transition have forced the governments of the region to search for other ways to pay debts. That has intensified the integration process between those countries.¹⁰⁸

At the moment cooperation is dominated by bilateral and more economically orientated relations (e.g. recently signed economic agreement between Tajikistan and Uzbekistan) and the ongoing dependence on Russia.¹⁰⁹

All these problems seem to ignore the perplexity relationship to the ecology. Efforts have been made to cope with ecological transformation, induced by human activities and their consequences. The extent of ecological problems affect the entire region. Against this background there may be an opportunity for increasing cooperation and confidence building.

B. APPROACHES TO SETTLE AND PREVENT ECOLOGICALLY INDUCED CONFLICTS

1. Fighting the Aral Sea Syndrome - Approaches on an International and Intra-regional Level

On the international level, beyond the Central Asian region the most prominent measure is the Aral Sea Environment Assistance Plan (ASEAP). In 1992, UNEP, as an institution of the UN presented a plan of action for the rehabilitation of the Aral Sea basin with estimated costs of \$ 212 million. In 1993, the World Bank in cooperation with UNDP

¹⁰⁸ Personal communication with the former German Ambassador in Kyrgyzstan, Dr. Scheller, March 13, 1997.
- Aiubov, S., Tajikistan/Uzbekistan: Relations Warming between Neighbors, in:
<http://www.rferl.org/nca/features/1997/02/F.RU.970220170719.html>, Dushanbe, February 20, 1997, p.1.

¹⁰⁹ Aiubov, S., Tajikistan/Uzbekistan: Relations Warming between Neighbors, in:
<http://www.rferl.org/nca/features/1997/02/F.RU.970220170719.html>, Dushanbe, February 20, 1997, pp.1-2.

presented an international aid program for the region. The World Bank is the largest international investor and coordinates almost all foreign support in the region.

The realization of the ASEAP-program is planned in three phases during the next 15 to 20 years. The total costs will be \$ 220 million. The first phase started in 1994 focusing on the following aspects:

- Improvement of water management (hyrotechnical installations, irrigation systems),
- Increase of the importance of hydrometeorological services,
- Improvement of water quality,
- Measures of renaturation around the Aral Sea,
- Improvement of water provision in terms of health and medical projects.

Financial aid is focusing on emergency aid, there is less allocation for the re-naturation of the Aral Sea and other ecological measures. These activities are based on the idea that immediate help concerning the improved treatment of water and medical care will achieve results quickly. But it is difficult to improve living conditions in the long run, if ecological conditions deteriorate.¹¹⁰

In March 1993 a non-binding intra-regional agreement was concluded on:

...common actions to solve the problems of the Aral Sea and the adjacent territories, on the sanitary recovery and socioeconomic development of the Aral region.

The agreement recognizes severe ecological consequences, e.g. microclimatic change. But the objectives in the field of water management were stressed. Ecological aims were the re-naturation of complex ecosystems within the river deltas around the Aral Sea, improvement of water quality and health conditions of the population. The Aral Sea is recognized as the sixth

¹¹⁰Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 322.

water recipient in the region. An Interstate Commission for the Aral Sea (ICAS) was established and an Interstate Fund for the Aral Sea (IFAS) was founded. But there are severe problems concerning financing issues.¹¹¹ However, if all these activities are successful and impoverishment of the Priaral region is stopped, then possibly the causes for conflict will decrease.

2. Approaches to Solve the Water Problem - Local, National and Intraregional Level

In order to prevent conflicts related to the water problem within the region, the focus must be on different levels. This is because institutions which must administrate irrigation systems on a local level, are confronted with different problems than on an intra-regional level. The discussion must consider the different hierarchical levels of local, national and intraregional level.

On all levels disputes arise and must be prevented and countered. Therefore, different measures and different institutions are required. Current water management seems to suffer from the former Soviet regulations and the transition phase. Lack of responsibilities, indecisiveness, less cooperation between the new states is accompanied by tendencies of nationalization and the assignment of insufficient resources for monitoring and control, especially at the local level, are problems which must be solved.

The motivation of this development is somewhat understandable: Central Asia faces a severe water crisis and has consequently also to cope with interrepublican claims. But the centralization at national level may be as unfortunate as the former union level. Such centralized agencies are not likely to be successful in solving the water management problems in Central Asia, as they do not cope with questions of monitoring and control at a local level.¹¹²

¹¹¹ Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung, Abschlußbericht des Environment and Conflicts Project ENCOP, Vol. I, Verlag Rüegger AG, Chur/Zürich 1996, pp. 270-271.*

¹¹² Klötzli, S., *The Water and Soil Crisis in Central Asia - a Source for Future Conflicts?* in: Bächler, G., Spillmann, K. R. (eds.), *Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, pp. 316-317.*

The privatization process must be incorporated in this entire process of solving problems. Generally, the privatization process is often misunderstood in the new republics.¹¹³ At first glance this might be contradictory to the aspirations for more participation and more collective organized administration on the local level. Although there is no tradition of privatized water resources, privatization seems to be necessary for responsible and careful use of water resources. On the other hand functioning institutions for water administration are necessary.

...combine local and central decision-making institutions in such a way as to maintain incentives among appropriators while encouraging interregional integration.¹¹⁴

Before Sovietization traditional water institutions (headed by honorable water masters) were vested with political power and operated very successfully. These institutions monitored and maintained water distribution systems on a local level.

Although a more sophisticated management coordinating the inter-republican water allocation is now necessary, nevertheless, some of the ancient principles of common water law are quite remarkable.¹¹⁵

Today there is some informal social organization in the Fergana Valley which control water distribution on a local level. The traditional water administration may be a good approach. Presuming there is an atmosphere with a good moral standing among the people, informal moral authorities, respected by the people, should handle water management.

This would mean a more autonomous canal administration and water district (irrigation system) administration with local participation in order to manage conflicts within irrigation systems.¹¹⁶

¹¹³Personal communication with the former German Ambassador in Kyrgyzstan, Dr. Scheller, March 13, 1997.

¹¹⁴Gleason, G., The Struggle for Control over Water in Central Asia: Republican Sovereignty and Collective Action, in: Radio Liberty Research, June 21, 1991, p. 19.

¹¹⁵Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, pp. 318-319.

¹¹⁶Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung.

A prerequisite for well-operating and functioning of the local level are legal arrangements on a national level which provide the local level with the legal framework necessary for functioning water management. The establishment of a new legal framework for water use and distribution (e.g. water pricing system) is very complex and should consider, for examples, economic and ecological aspects, rational utilization for needs of the population, protection of water quality and more.

In 1991 shortly after independence, the new republics started dealing with the water issue and its coherent causes for conflict on intra-regional level. Against the background of emergence of inter-republican water problems, and in order to cooperate, the new republics signed a water agreement in 1992; "for the cooperation in the field of water management to use and protect water resources from international sources."

They attempted to establish an equitable system of water distribution which should have replaced the old Soviet system. A joint coordination committee was created, consisting of the national water ministers, called Intergovernmental Coordination Committee for Water Supply (ICWC). The agreement deals with control over water utilization and water pollution and determines limits of water utilization related to the states. The agreement was constituted with regard to international law concerning the use of trans-border water resources. The agreement also recognizes the principles of international water law and the states intention to solve water problems and all connected ecological problems. The agreement brought attention to the Aral Sea crisis and recognized the Aral Sea as a sixth water recipient in the region.

This means that the agreement is more important than a technical agreement, and it is an appreciable approach to solutions based on the Helsinki Rules on the "Uses of the Waters of International Rivers."¹¹⁷ The national interests of the sovereign republics in using and protecting water resources are stressed in the agreement. However, there is good prospect that

Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 317.

¹¹⁷ Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, pp. 317-321.

the agreement will contribute to encourage cooperation in the field of water distribution and confidence building in general.

...only unification and coordination of actions allow the creation of favorable conditions to solve socioeconomic problems and to relieve ecological stress in the consequences of water misuse.¹¹⁸

The World Bank pointed out that:

...despite the water agreements ..., the potential for future water disputes cannot be ignored. Comprehensive planning and management of water resources of Amu and Syr Rivers should receive high priority, both for using the resources efficiently and for improving regional cooperation in sharing the resources.¹¹⁹

In this context, the ICCWC maintained the river basin enterprises (BVO). These agencies are the operative organ of the ICCWC and realizes joint decisions. This should improve control over hydrotechnical installations and settle contentions about limits of water use among the republics based on quotas in effect during Soviet rule. There is still a problem in that the BVO are not adequately equipped to fulfill this task effectively. The remaining water resources under national control. Suspension of joint control or nationalized water distribution facilities (e.g. Tajikistan, Karakum-Cannel, Tujamujun dam) has been counterproductive. This demonstrates a lack of binding legal value of the water agreement. As a matter of fact national interests still exist and the willingness to cooperate is limited in handing over responsibilities to international and intraregional institutions.¹²⁰

¹¹⁸ Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 322.

¹¹⁹ The World Bank (ed.): The Aral Sea Crisis. Proposed framework of activities, 1993, p. ii.

¹²⁰ Personal communication with the former German Ambassador in Kyrgyzstan, Dr. Scheller, March 13, 1997. - Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung, Abschlußbericht des Environment and Conflicts Project ENCOP, Vol. I, Verlag Rüegger AG, Chur/Zürich 1996, pp. 267-270. - Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, pp. 321-323.

C. ASSESSMENT AND RECOMMENDATIONS

The primary ecological causes for conflicts are water and land shortages, resulting from irrigation, storage of water resources, erosion, salinization, desertification and toxication. From these causes for conflicts, conflicts with different severity have evolved. The conflicts have to do with the use and exploitation of resources, especially water and land. Furthermore, vast parts of the region are increasingly subject to impoverishment. These conflicts occur between the independent states as well as within the states.

On an international level the most significant conflict related to ecological causes for conflict, arose in the Toktogul dam issue between Kyrgyzstan and Uzbekistan. On the sub-national level in the Fergana Valley a major violent conflict arose. All the above mentioned conflicts were (still are) characterized over contentions about use/exploitation of resources, e.g. up-/down-stream conflicts and discontent about impoverishment.

The causes for conflict, are significantly ecological transformation. But there are also secondary problems (e.g. health) which are influenced by ecological transformations and its consequences. These secondary problems are inter-connected to the ecological causes and can establish a magnifying potential of aggression in future, e.g. deteriorating conditions of health and living conditions, economic strains, etc. Identified ecological conflicts are not characterized by mono-causal interrelation. Causes for conflict are acting in combination. Ecological causes are often acting in combination with economic, demographic and ethnic factors in the Central Asian region.

This makes the analysis of the conflicts more complex. However, linkages between ecological transformation and conflicts exist, and ecological causes for conflict are established as one causal element in the development of conflicts. The causal pathways can lead directly to conflicts or secondary problems (e.g. Migration) may be initiated, which can itself lead to conflict.

With the Toktogul dam as an ecological transformation induced by human activities, Kyrgyzstan has the chance to control the river flow of the Syr Darya river, and affect the availability of water resources in Uzbekistan. The dispute in 1993 can be seen as an open conflict between Uzbekistan and Kyrgyzstan with a good chance of becoming an acute conflict.

Only the economic and water-related inter-dependence has prevented a more severe conflict between Uzbekistan and Kyrgyzstan.

Severe conflicts in the Fergana Valley are influenced by ethnic factors. Migration to urban areas established ethnic conflict fault lines and contributed to a polarization of the population. Reasons for migration are often ecological degradation in the rural regions. Another aggravating factor is the extremely high rate of population growth. These conflicts are often limited. Usually there is less proneness for an extension of the conflict. Most often these conflicts are found in highly ethnically mixed areas.

This study still depends on assumptions of an interrelation between the ecological situation and the main conflict fault lines. Many conflicts in Central Asia were brought about because of ecological factors. But for a thorough analysis of the mechanisms between ecological, economic, socio-cultural, and ethnic factors, the database are not yet detailed enough.

Prediction of future developments in these conflicts is difficult. The prognosis primarily depends on the following uncertainties.

- The interaction between ecological and non-ecological factors has not been sufficiently examined
- An assessment for future developments of non-ecological factors, and other basic conditions to which ecological factors are related, is rather difficult

In the case of the Toktogul dispute between Uzbekistan and Kyrgyzstan the conflict may develop into a more severe conflict specific due to economic factors. First, every independent state intends to stabilize the political situation, and to improve the economic situation. These are the major objectives these states are striving to achieve. At the moment, other objectives like, ecological issues, are less important.¹²¹

The increase of hydroelectric power production is Kyrgyzstan's primary effort to improve its economic situation. But the needs for irrigation on Uzbek side and maximum

¹²¹Dr. Kravchenko, I. N., Lecture and personal communication, March 8, 1997.

energy use on Kyrgyz side are incompatible objectives. Against this background further disputes can be expected. This conflict may potentially escalate as the economic situation diminishes. But, it can be assumed, that both countries are trying to settle future problems.¹²²

Water disputes on an international level seem not to be expected. Only when high economic and demographic pressure builds up in different states is there proneness to take control over water resources. This is true especially in such cases when ethno-territorial claims against each other contribute to an escalation (e.g. Uzbekistan - Kyrgyzstan).

Acute conflicts over the distribution of water and soil resources are likely to occur on the subnational level within irrigation systems existing along ethnic or tribal fault lines, together with other stress factors like economic depression, high rural population density, and unemployment.¹²³

Besides the disputes over water resources which occur on different political levels, the problem of water quality and pollution is not sufficiently taken into account. This problem may lead to new causes for conflicts between upper and down stream riparians along the middle and lower river flows. The problem may be aggravated because of the difficulties in identifying the parity that causes the pollution and the fact increasing numbers of fare-dodgers.¹²⁴

Despite the uncertainties of predictions of future conflicts, it is necessary to think about prevention and to deal with this problem of improving the instruments and devices for prevention and efficient conflict settlement.

These conflicts show that available instruments and devices for conflict settlement are not sufficient. Although the "ASEAP-programm" is a very ambitious project initiated on international level, intra-regional activities are controversial. There is less willingness by the republics to hand over responsibilities to intra-regional institutions. The republics' focus is still

¹²²Personal communication with the former German Ambassador in Kyrgyzstan, Dr. Scheller, March 13, 1997.

¹²³Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), *Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern*, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 328.

¹²⁴Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung, Abschlußbericht des Environment and Conflicts Project ENCOP*, Vol. I, Verlag Rüegger AG, Chur/Zürich 1996, p. 283.

on national development programs and the national interest. Although the catastrophe concerns all states, activities to solve the problems are less developed. The new independent republics are trying to internationalize the problems and involve the world community.

The intra-regional agreements and established institutions are insufficient instruments for efficient conflict settlement and prevention. These agreements focus mostly on the water problem. Problems like soil degradation, water pollution and increasing future ecological sources of threats, such as climate change or secondary problems with a potential of causes for conflicts, for example health, are not considered. The approach is to reduce something to the lowest common denominator. But this is not enough, and encourages the parties to behave as fare-dodgers. The intra-regional agreements and institutions lack the legally binding force required.

Water is still regarded as a strategic resource and should remain state property. This is in the interest of the central bureaucracy and the elite. Economical aspects of water utilization are still more important than ecological questions. The expected regional development and the increase of national interests has not diminished the number of conflicts.

An efficient intra-regional water distribution system must be established. The contradiction between re-centralization versus revival of local participation in the question of water management must be overcome. The establishment of a system of institutions that is adequate on all political and hierarchical levels, is necessary.¹²⁵

Enhancing the role and importance of the ICCWC and BVO, strengthening of their responsibilities and intensification of cooperation in terms of confidence building, as well as settlement of conflicts will be advantageous. But this will also require a more legally binding inter-republican agreement.

Institution-building should concentrate on the reformation of the BVOs from an interrepublican to an international organization based on a state treaty between the five republics. The creation of further BVOs ... and the full

¹²⁵ Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), *Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern*, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 329.

integration of the Aral Sea as an international water body into the distribution concept of the BVOs are also essential for an effective functioning of a comprehensive water management.¹²⁶

The resurgence of traditional methods of water management and decentralized administration at the local level according to the water distribution system before Sovietization seems to be a recommendable approach. Strengthening of the local water management without institutional power, and more participation, may have a valuable effect on settlement of conflicts at the local level.

The strengthening of non-government organizations in the ecological field, especially partnerships between domestic and international organizations, is a remarkable approach to support the demonstration of outrages often executed by these institutions.

In short term view, foreign assistance can be provided by improving living conditions in the most affected areas, e.g. in the river deltas around the Aral Sea. To improve standards of living and counteract the demographic ills and social degradation, it will be necessary to create a social economic conception of development.¹²⁷

Furthermore, know how and a technology transfer to support a more efficient water management should take place. Alleviation of the water and soil crisis can be met by improving supply-side management and demand-side management. The supply-side management may prefer small and simple solutions to increase water resources instead of expensive and unrealistic projects (e.g. diversion of Siberian rivers or pumping of water from the Caspian Sea).¹²⁸

Regarding the demand-side management the water consumers must be involved in more resources management. The demand side can be controlled by technical and economic

¹²⁶ Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), *Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern*, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 323.

¹²⁷ Rumer, B. Z., *Soviet Central Asia, "A Tragic Experiment"*, Unwin Hyman, Boston, 1989, p. 186.

¹²⁸ Barandat, J., Wasser, Regionaler Konfliktstoff weltweiter Bedeutung, in: Institut für Friedensforschung und Sicherheitspolitik an der Universität Hamburg (IFSH), *Hamburger Beiträge zur Friedensforschung und Sicherheitspolitik*, Heft 96, Hamburg, November, 1995, pp. 26-27.

means (e.g. water pricing). Water utilization efficiency must be improved in the entire region. In a medium and long term view, land use reform and privatization can promote more efficient use of water resources. Crop diversification can reduce water utilization and improve the regional food supply.

Last a sensitive aspect must be considered, at first glance the birthrate and ecological problems appear only remotely connected. But in order to solve the water and soil crisis in Central Asia, and the resulting conflicts, this factor must be addressed. Although this issue is not to be examined in this study, it must be stated that increasing population growth contributes to the problems, and hinders an ecological solution.

Indeed, there are a lot of political, economic and social obstacles (e.g. land reform, privatization, cotton as a cash crop, old elite, population growth, economic situation ...) but behaving in an apathy way will magnify the catastrophe. Most important is political will. A sensitization of the political decision-makers for the extent of the problem is an absolute need.¹²⁹ Economic and political priorities must be changed, the willingness for overhanding rights and responsibilities of intra-regional institutions must increase.

For these [above mentioned] solutions become reality is not necessarily a question of know-how and finance, but one of political will of the five republics. The interrepublican obstacles for cooperation cannot be ignored. Ethnic and nationalist rivalries as well as the economic crisis after the disintegration of the USSR jeopardize the search for a collective water management. But the Aral Sea syndrome is not only a matter of Central Asia: it is an alarming signal of the human-ecological transformation taking place on the entire planet.¹³⁰

¹²⁹Dr. Kravchenko, I. N., Lecture and personal communication, March 8, 1997.

¹³⁰Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), *Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern*, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 329.

VI. POLICY-ORIENTED APPROACHES TO A GLOBAL SYSTEM OF PREVENTIVE MEASURES COUNTERACTING ECOLOGICAL SOURCES OF THREAT

To be prepared for the security challenges of the 21st century, ... we need to begin now to devise new strategies and structures. The scope of what is considered 'security' will have to be expanded as well as the means of addressing new problems. This requires a multidimensional strategy encompassing such issues as ... environmental issues. These matters will have to be addressed through a collaborative approach among the states and institutions affected.¹³¹

The examination of the Central Asian region has shown that ecologically induced conflicts take place, and more causes for conflict can be expected in future. In the former Soviet Union and the new independent states in Central Asia modernization policies and the demand for steadily increasing yields and outcomes have devastated natural resources, water as well as soil and other ecological media.

This has also been true across the developing world, from India to Nigeria, where the evidence accumulates of damage inflicted upon land, air, and water by human actions.¹³²

Significant ecological degradation is mirrored in the global dimensions and these global dimensions are inherent in an ecological threat to security.¹³³ Recognizing these problems as causes for conflict is a tremendous challenge for the world. It is necessary to think about activities that are apt to prevent future ecologically induced conflicts. In order to minimize these causes for conflict a comprehensive system of measures should be developed. Besides science-oriented measures, policy-oriented measures are an additional part of the spectrum of

¹³¹ Prins, G., Die sicherheitspolitischen Herausforderungen des 21. Jahrhunderts, in: NATO Brief, Januar, 1997, p. 27.

¹³² Kennedy, P., Preparing for the Twenty-First Century, Vintage Books, New York, 1993, p. 102.

¹³³ Ecologic-Centre for International and European Environmental Research, Potsdam Institute for Climate Impact Research, Berlin, (ed.), NATO CCMS Pilot Study, Environment and Security in an International Context, State of the Art and Perspectives, Interim Report, October, 1996, p. 2.

preventive measures.¹³⁴ Counter-acting certain symptoms require measures that exceed our present understanding.

Our challenge is to start addressing future security problems with today's way of thinking and today's institutions, ...¹³⁵

Successful counter-acting of superficial symptoms fails to eradicate the deeper causes of conflict.

The very first step is to increase the awareness of these new global threats endangering our security and to review the perception of the term security.¹³⁶

Much remains to be done to raise public awareness and to prepare political decisions.¹³⁷

Although the consideration of ecological problems has become part of national and international politics, the integration in the sphere of "higher politics" is not yet completed. The linkages between ecology and security policy are still an unfinished work.¹³⁸

... phenomenon is that the commanding structures of power are increasingly powerless when addressing the range of new security problems that we have to face.¹³⁹

Still today the world community is not well prepared to solve these problems.

¹³⁴ See: Threat - Preventive Measures - Ecogeographical Region, p. 7.

¹³⁵ Prins, G., Die sicherheitspolitischen Herausforderungen des 21. Jahrhunderts, in: NATO Brief, Januar, 1997, p. 27.

¹³⁶ Further general policy-oriented measures can be the increase of energy productivity (regarding the political decision) or changes concerning patterns of land tenure - "Land reform is among the most difficult of all political undertakings, but without it many countries will be unable to create a healthy agricultural sector to fuel economic growth" (Mathews, J. T., Redefining Security, in: Foreign Affairs, Vol. 68, No. 2, 1989, p. 166.) Besides the mentioned measures, also the political decisions to establish family programs and informational campaigns to change behavior of consumption are general policy-oriented measures which are contributing to the prevention of ecologically induced conflicts in a broader sense. However, as already mentioned these issues are worthy to be examined separately. As a starting point the increasing of awareness and the extension of security seem to be an essential basis.

¹³⁷ Ecologic-Centre for International and European Environmental Research, Potsdam Institute for Climate Impact Research, Berlin, (ed.), NATO CCMS Pilot Study, Environment and Security in an International Context, State of the Art and Perspectives, Interim Report, October, 1996, p. 2.

¹³⁸ Müller, F., Internationale Konflikte durch Umweltgefährdung, in: Europa-Archiv, Folge 16, 1993, p. 471.

¹³⁹ Prins, G., Die sicherheitspolitischen Herausforderungen des 21. Jahrhunderts, in: NATO Brief, Januar, 1997, p. 30.

Recognizing a shared responsibility for global stewardship is a necessary step for global progress.¹⁴⁰

A. GENERAL POLICY-ORIENTED APPROACHES

1. Review of Political and Conceptual Basis - Educational Work and Comprehension of the Vulnerability Induced by Ecological Sources of Threat

Subsidies, pricing policies and economic discount rates encourage resource depletion in the name of economic growth, while delivering only the illusion of sustainable growth. The population growth remains a controversial subject in much of the world. The traditional prerogatives of nation states are poorly matched with the needs for regional cooperation and global decision-making. And ignorance of the biological underpinning of human society blocks a clear view of where the long-term threats to global security lie. Overcoming these political and economic barriers will require social and institutional inventions comparable in scale and vision to the new arrangements conceived in the decade following World War II.¹⁴¹

Perhaps a thorough threat assessment and risk analysis¹⁴² can contribute to more knowledge and understanding of the vulnerabilities of ecologically induced threats to security. This understanding would increase sensitivity to ecologically induced causes for conflict. It is very difficult to assess these kinds of risks. The relationship between decreased vulnerability and increased security is difficult to measure.

¹⁴⁰ Ambassador Rodney Kennedy-Minott, *Environmental Degradation as a National Security Problem: The Navy, Naval Postgraduate School, Monterey, CA*, p. 3.

¹⁴¹ Mathews, J. T., *Redefining Security*, in: *Foreign Affairs*, Vol. 68, No. 2, 1989, pp. 172-173.

¹⁴² To get deeper into the field of threat assessment with specific regard to ecologically induced causes for conflict one can pose the following questions, for example:

What are criteria for an assessment to which extent specific conflicts have been caused by ecological transformation?

What are criterias for the assessment of security risks induced by ecological transformation? (for instance, incongruity of ecoregions and state territory)

These questions need detailed scientific research and evaluation of different case studies. In the Central Asian region, for instance, criteria for the assessment of security risks induced by ecological transformation can be the dependence on water resources by several states, incongruity between the territory of the ecoregion and sovereign states, identification of soil degradation.

After the oil crisis in the 70s Western countries became sensitive to a cutoff of oil. Many western analysts interpreted the Soviet invasion of Afghanistan as an expansion to the Persian Gulf. Politically the most salable response to this threat was the Rapid Deployment Force. A further example was the Gulf War in 1991. However, most often the absence of a consensus creates an obstacle in coping with unconventional threats.¹⁴³

There are many obstacles in the way of increased sensitization and awareness of the consequences of ecological transformation and the need to create preventive measures. But the extent of the ecological damage shown by the Central Asian region makes the requirement for measures and increasing educational work clear.

It is the connectivity between the natural and social processes that is required to understand the nature of environmental problems in respect to security considerations. The most striking feature of ecological problems is complexity.¹⁴⁴

In order to stop further ecological problems, political decision makers must be sensitized to the evolving ecological threat.¹⁴⁵

A convenient characteristic of military threats to national security is that their possible consequences are relatively apparent and, if made actual, they work their harm rapidly. Therefore, they are relatively noncontroversial. The less apparent a security threat may be - whether military or nonmilitary - the more preparations to meet it are likely to be the subject of political controversy.¹⁴⁶

For example, it is relatively easy to organize responses to such clear and present dangers as an antagonistic state such as the former Soviet Union. To get an agreement on the use of other means of influence, for instance foreign aid, it is often quite difficult. Therefore, the whole dimension of ecological threat, not only concerns the well-known and expected health

¹⁴³Ullman, R. H., *Redefining Security*, in: *International Security*, Vol. 8, No. 1, 1983, p. 146-150.

¹⁴⁴Tennberg, M., *Risky Business: Defining the Concept of Environmental Security*, in: *Cooperation and Conflict*, Vol. 30 (3), 1995, p. 248.

¹⁴⁵An appreciable example for precedent information is the IPCC report: *Intergovernmental Panel on Climate Change*, IPCC (ed.), *Climate Change 1995: Impacts, Adaptations, and Mitigation, Summary for Policymakers*, Contribution of Working Group II to the Second Assessment Report, Montreal, 1995.

¹⁴⁶Ullman, R. H., *Redefining Security*, in: *International Security*, Vol. 8, No. 1, 1983, p. 135.

problems but also the implications for security policy. The implication must become obvious to the decision-makers as well as to the people.

One of the forces holding back effective international action for environmental conservation in the past has been a dominant social paradigm that justifies unlimited exploitation of nature. Despite the weakening of that paradigm and the widespread adherence to the sustainable development paradigm in some sectors of societies, paradigm shift may take many years to complete because of its dominance in powerful political and economic institutions.¹⁴⁷

Today, the objective is to ensure sustainable development, agreed to in the Earth Summit in Rio de Janeiro in 1992. It seems that the goals of an equal worldwide development cannot be attained under the conditions of poverty and structural heterogeneity. Development to catch up has not been realized as planned in the recent past. In particular the principle of sustainability is appreciable. The perception, that is suggested, may lack the materiel basis for realization.

The globalization of the Western model of consumption is insupportable. Twenty percent of the world population use more than seventy percent of world's energy. The industrialized countries consume more than eighty percent of the currently available resources of the world. The applicability of this model to the developing countries is not possible. This is especially true against the background of the existing overpopulation of the world and an approximate rate of population growth of almost 90 million people per year.

Eighty percent of the yearly population growth will take place within the developing regions. The developing countries cannot realize the process of modernization that happened in Europe over a long period. The development would be in a much shorter time under more difficult conditions and likely increasing ecologically induced conflicts. This situation requires a tightly connected cooperation between ecological policy, foreign aid, and security policy.

The world must enhance ecological aspects in security deliberations and include security considerations in national and international environmental policies and instruments.

¹⁴⁷Porter, G., Brown, J. W., *Global Environment Politics*, 2nd edition, Westview Press, Boulder, 1991, p. 32.

... [R]eason for adopting an expansive understanding of environmental security with particular emphasis on protection of the environment itself is the need to highlight common concerns that can help to counterbalance the preoccupation with competing state interests.¹⁴⁸

New priorities in national and international policy making are necessary. In the past, there was an ongoing debate on conceptual issues, on the one hand, stressing the old traditional concept of security and on the other hand, pointing out a new concept of environmental security.

Suggestions to include ecological aspects in the concept of national security took place as early as in 1983.¹⁴⁹ Ecological sources of threat were seen as a threat to the physical foundation of the state that were an additional risk in the traditional concept of national security. In contrast to this point of view, advocates claimed a wider framework than traditional national security. A framework that includes the challenge of the global dimensions of ecological sources of threat.

This discussion is still dominated by insufficient definitions.¹⁵⁰

... [T]he concept 'environmental security' makes one expect a concept of security that takes as its referent object the environment in one way or another. However, this is not the case: current security thinking lacks a referent object that would focus on the environment. Such an object could be expected in as much as 'national security' refers to the security of the nation-state, 'global security' to the security of the international community, and 'regional security' to the security of a specific territory.¹⁵¹

¹⁴⁸ Brunnée, J.; Toope, J., *Environmental Security and Freshwater Resources: Ecosystem Regime Building*, in: *American Journal of International Law*, 1997, p. 27.

¹⁴⁹ Buzan, B., *People, States and Fear. The National Security Problem in International Relations*, Harvester Wheatsheaf, Brighton, 1983, p. 82; quoted from: Tennberg, M., *Risky Business: Defining the Concept of Environmental Security*, in: *Cooperation and Conflict*, Vol. 30 (3), 1995, p. 241.

¹⁵⁰ The term "environmental security" is deliberately rarely used in this thesis, because of the variety of different understandings and to avoid confusion. "The alternatives range from defining 'environmental security' as 'the protection of armed forces from environmental threats' to a broader definition: basically the absence of severe environmental problems or positively, as the realization of sustainable development." (Ecologic-Centre for International and European Environmental Research, Potsdam Institute for Climate Impact Research, Berlin, (ed.), *NATO CCMS Pilot Study, Environment and Security in an International Context, State of the Art and Perspectives*, Interim Report, October, 1996, p. 6.)

¹⁵¹ Tennberg, M., *Risky Business: Defining the Concept of Environmental Security*, in: *Cooperation and Conflict*, Vol. 30 (3), 1995, p. 244. - see also: Brunnée, J.; Toope, J., *Environmental Security and Freshwater Resources: Ecosystem Regime Building*, in: *American Journal of International Law*, 1997, p. 27.

The point is to review and extend security to include ecological components in the concepts of national, regional, and global security¹⁵² and to ensure:

... a better understanding of the nature of certain threats to security, specifically the links between environmental and resource problems and international behavior.¹⁵³

The conception of security must ... be changed to reflect the threats of environmental degradation.¹⁵⁴

The relationship between ecologically induced causes for conflict and security is pointed out in the examination of the Central Asian region. The findings of this study has implications for the international behavior with specific regard to the creation of a comprehensive system of preventive measures.¹⁵⁵ The following explanations will show the necessity for an extension of security in more detail. This should contribute to the process of raising awareness for the new challenges to security studies.

2. Review of the Term Security - Extension of Security

In the past, resource scarcities and ecological degradation have not been regarded as a problem of international politics and security policy. The traditional meaning of security was:

... the defense of territorial and political integrity, which was understood as the fundamental, the immutable, objective of states in the international system. International relation before the last part of the twentieth century was, indeed, primarily concerned with security in this narrow sense Environmental issues barely appeared on the international agenda.¹⁵⁶

¹⁵² See: Figure 19. Institutionalization and Conceptual Incorporation of Ecological Aspects, p. 95.

¹⁵³ Gleick, P. H., Environment and Security: The Clear Connections, in: Bulletin of the Atomic Scientists, Vol. 47, No. 3, 1991, p. 17. - The relationship between ecologically induced causes for conflict and security is pointed out in the examination about the Central Asian region.

¹⁵⁴ Dabelko, G.&D., Environmental Security: Issues of Conflict and Redefinition, in: Woodrow Wilson Center (ed.), Environmental Change and Security Project Report, 1995, p. 8.

¹⁵⁵ This does not mean that the findings from the Central Asian region should be generalized. In this context, drawing conclusions from a specific case to a general approach would be misleading. More examinations on cases have to be done to verify a general approach. - See: SPECIFIC MEASURES AS PART OF A GLOBAL SYSTEM PREVENTING ECOLOGICAL SOURCES OF THREAT, p. 80.

¹⁵⁶ Krasner, S. D., "International Relations Theory and Global Environmental Issues," presentation at the workshop, "Global Resources and Environment: Arenas for Conflict, Opportunities for Cooperation," Pacific Institute for Studies in Development, Environment, and Security, Berkeley, March 15-17, 1990.

During the Cold War security policy was mainly characterized by an antagonistic situation that led to a build-up of military potential of threat on both sides. Against this background consensus on military solutions were easily obtained and concentration in this area was unavoidable.

..., the tendency of American political leaders to define security problems and their solution in military terms is deeply ingrained. The image of the President as the Commander in Chief is powerful. When in this role he requests additional funds for American Military Forces the Congress and the public are reluctant to gainsay him. When he requests funds for economic assistance to third world governments, he is much more likely be disputed even though he may contend that such expenditures also provide the United States with security.¹⁵⁷

It must be mentioned that this quotation is taken from an article published in 1983. This statement does not exactly reflect today's realities. Nevertheless, this controversial and debatable article contributed to the aggravation of a discussion about the extension of security. In this context, opponents of an extension of the term security were already talking about a crisis in security studies in general.

Alternative conceptions of national security have become increasingly popular. Most of these conceptions were driven by non-government organizations. Alternatives tried to make progress in increasing the awareness of nonmilitary threats and the vulnerability of society.

...problems that are manageable today may prove far less tractable in the future. And while political will and energy are focused predominately on military solutions to the problems of national security, the nonmilitary tasks are likely to grow ever more difficult to accomplish and dangerous to neglect.¹⁵⁸

Kenneth Jowitt mentioned in 1993,

Among the myriad of changes and adaptations that we must make, we must realize that environmental issues have strategic trans-boundary implications that should be incorporated into any new definition of National Security.¹⁵⁹

¹⁵⁷ Ullman, R. H., *Redefining Security*, in: *International Security*, Vol. 8, No. 1, 1983, p. 152.

¹⁵⁸ *Ibid.*, p. 153.

¹⁵⁹ Jowitt, K., *Desintegration*, lecture given at the U.S. Naval Postgraduate School, Monterey, CA, August, 1993, quoted from: Ambassador Rodney Kennedy-Minott, *Environmental Degradation as a National Security Problem: The Navy*, Naval Postgraduate School, Monterey, CA, p. 1.

a. Development of the Term Security in the U.S.

(1) Security Studies in the U.S. - A Rough Overview. In the United States there is a tightly connected relationship and correlation between political science and practical politics. After World War I there was a change from rational-progressive ideas to a more empirical-realistic orientation. Politics demanded a more scientific expertise in international affairs, which led to a symbiosis between science and politics. From the discipline of international relations the main focus on security emerged, and was named National Security Affairs (in a more narrow military-technical sense Strategic Studies). Later in the sixties the term International Security Studies was used.¹⁶⁰ The fusion of the political and economic meaning of the term security was initiated by President Roosevelt. This was the starting point for American security concepts after World War II.

The National Security Act in 1947 established the institutional structure for the areas of foreign policy and the military. Part of this new structure was the National Security Council that developed as an important advisory body. Within this council military theories and strategies were developed by scientific experts. This intensified the relationship between science and politics. The development of the American security concepts can be divided in three phases until 1980.¹⁶¹

(2) Developmental Stages of the Term Security. During the phase from 1945 until the Korean War in 1950, the term security was defined in a more narrow sense. With George Kennan the term security underwent a delimitation on Europe and instrumentally a concentration on economic aid (primarily economic objectives of the strategy of containment). Military means gained more importance regarding the Truman Doctrine.

With the publishing of the NSC-68 in 1950 until 1968, the objectives and challenges of the national security policy changed. The security interests were extended regarding the geographical and instrumental sphere. The NSC-68 marked a significant change

¹⁶⁰ Why does not the Naval Postgraduate School use this term instead of National Security Affairs?

¹⁶¹ Mandelbaum, M., *The Fate of Nations. The Search for National Security in the Nineteenth and Twentieth Centuries*, Cambridge, 1988. Quoted from: Daase, C., *Der erweiterte Sicherheitsbegriff und die Diversifizierung amerikanischer Sicherheitsinteressen. Anmerkungen zu aktuellen Tendenzen in der sicherheitspolitischen Forschung*, in: *Politische Vierteljahresschrift*, Vol. 32, No. 3, 1991, pp. 431-437.

from Kennans Containment Strategy to a broader national security policy, that extended drastically in its area of responsibilities. National Security Policy changed from concentration on significant focal points, to a broader concept of security policy, dealing with many aspects of equal importance. From this time, American national security and interests were defended in Vietnam and Korea. The difference between vital and peripheral interests became blurred.

From 1968 until 1980, the definition of security again became significantly narrowed. After the collapse of the international monetary system and the oil crisis in the seventies, the awareness concerning the relationship of economic stability and international security grew and initiated a new orientation within the security studies. This orientation in American National Security Policy corresponded to a concentration on vital security interests (for example Carter Doctrine and the concentration of the Persian Gulf region because of political and economic reasons).

Already with the Carter-Doctrine and after 1980 a diversification of the term security appeared, due to a more selected and problem-orientated differentiation of national interest. Scientific research within the security studies supported this development. The conceptualization of economic security in the seventies was the beginning of the developing extension of the term security.

Accompanied by the decreasing threat from the East in the 80s, and an increasing sensitization about new sources of threat, crucial areas, for instance the environment, became more important and establish a basis for a further extension of security (See Figure 17).

President George Bush formally linked the two concepts for the first time in his January 1993 National Security Strategy of the United States. President Bush's perspective on the environment was that a healthy environment meant a healthy economy, and a healthy economy meant robust national security.¹⁶²

¹⁶² Bush, G., National Security Strategy of the United States, January 1993; quoted from: Carr, R. B., *The Greening of Global Security: The U.S. Military and International Environmental Security*, Master's Thesis, U.S. NPS, December, 1993, p.5.

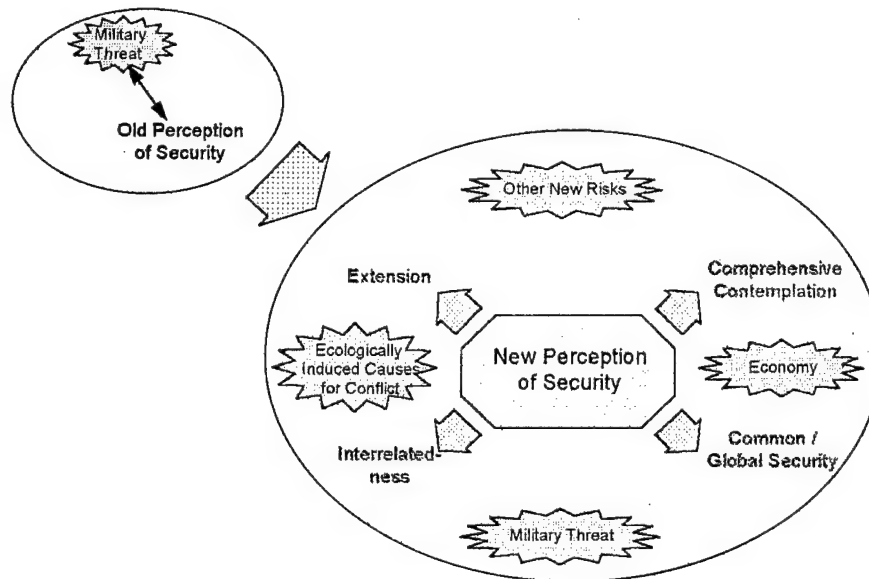


Figure 17. New Perception of Security

b. *Redefinition of Threats and Extension of Security - A Controversial Debate*

The discussion about the extension of the term security started to become a controversial debate in the 1980s. Several scientists began to review security and conceptualize these new sources of threat.

We are, of course, accustomed to thinking of national security in terms of military threats arising from beyond the borders of one's own country. But that emphasis is doubly misleading. It draws attention away from non-military threats that promise to undermine the stability of many nations during the years ahead.¹⁶³

In contrast to a definition of national security in narrow and military terms the new definition was extended to a wider range of possible threats to the quality of life and policy choices to the government and the people of a state (See: 2. Threat - Preventive Measures - Ecogeographical Region, p.7).

Critics point out that this kind of definition of national security policy encompasses the kind of precaution that do not fight acute threats but try to reduce preventable

¹⁶³Ullman, R. H., Redefining Security, in: International Security, Vol. 8, No. 1, 1983, p.133.

vulnerabilities to national interests. Thus, security policy is no longer focusing on rebellions, blockades, sanctions, and wars but deals with issues like migration, health-related threats, and ecologically caused conflicts. Critics believe that such an extension of the term security is not apt to provide a rational threat analysis, and will be misleading in the theoretical and political view.

However, there are new sources of threats that challenge national and international security. While in the seventies the concept of national security expanded to include international economics the demands for the nineties includes demographic and environmental issues. Against this background an adaptation and an extension of security seem to be necessary. But critics see such an approach as unrealistic. They argue then that the protection of the entire international environment must be seen as being in the major powers' national interest.¹⁶⁴ The scientific operationalization of the term security seems to the critics questionable. To discuss aspects of environmental security in the framework of national security is very much in doubt among these critics.

Critics are rejecting an extension of the term of security and are stating that security studies is defined as maneuvering into a crisis. They alleged that due to an extension of new fields, the research program of security studies will lose theoretical coherence, ability of explanation, and political rationality.¹⁶⁵ In the eyes of the critics the conquest of new security relevant fields and the extension of security are seen as a crisis. They believe that the changes may be the beginning of a lost war against other academic disciplines. They fear a backwardness in theoretical development behind empirical research. Furthermore, they believe that terms will become increasingly inaccurate and the long-term coherence of security studies will be threatened.¹⁶⁶

¹⁶⁴ Daase, C., Der erweiterte Sicherheitsbegriff und die Diversifizierung amerikanischer Sicherheitsinteressen. Anmerkungen zu aktuellen Tendenzen in der sicherheitspolitischen Forschung, in: Politische Vierteljahresschrift, Vol. 32, No. 3, 1991, p. 442.

¹⁶⁵ Daase, C., Der erweiterte Sicherheitsbegriff und die Diversifizierung amerikanischer Sicherheitsinteressen. Anmerkungen zu aktuellen Tendenzen in der sicherheitspolitischen Forschung, in: Politische Vierteljahresschrift, Vol. 32, No. 3, 1991, p. 425.

¹⁶⁶ Ibid., pp. 426-427.

Advocators of the redefinition of security are presenting facts of the current situation and future scenarios pointing out the necessity for an extension of security due to the emergence of new sources of threat. An example, is environmental degradation and the growing world population.¹⁶⁷ From their point of view, during the Cold War national security was defined in narrow and military terms. The ideological contradictions in a bipolar situation caused the build up of potentials of military threat on both sides. The North Atlantic Treaty was signed in direct response to the perceived threat of Soviet aggression in Eastern Europe. The purpose was deterrence maintained by fielding sufficient armed forces. The term security was an unavoidable product of the reality of security interests. After the end of the Cold War an adaptation seems to be adequate and reasonable.

The concept of extended security:

... has gained broad acceptance. In addition to military security, this encompasses the relationship between democracy, state and society, social stability, and environmental concerns. And in the North Atlantic region as well as other areas, these newer elements play a much larger role today than they used to ... We are only just beginning to appreciate how dependent security is on other, related factors, including environmental concerns, resource management and sustainable development ... security, in the extended sense, cannot be ensured by military means alone [and] it is not possible for any one country to safeguard its security unilaterally.¹⁶⁸

¹⁶⁷ The following example shows the dramatic consequences of this vicious circle we get into. The effects on cutting down the tropical forests is soil erosion. Cultivation of the land is continually growing worse. Natural fertilizer used for the land in the past, is now used as a substitute for wood fuel which is no longer available. This means the harvest does not bear as much, and crop failure will take place more often.

The growing rural population can no longer sustain themselves, and migration starts looking for better places to live. Most often we can recognize migration to urban areas, these well-known Third World cities, containing millions of people suffering from drastically deteriorating living conditions, and building up grounds for criminality and violence, enforced by other factors like ethnic and religious tensions. (Ullman, R. H., *Redefining Security*, in: *International Security*, Vol. 8, No. 1, 1983, pp.141-143.)

These tensions may also concern the rich industrialized countries. "For the United States, the most directly felt pressure is that of would-be immigrants, some coming through lawful channels, most coming illegally" (Ullman, R. H., *Redefining Security*, in: *International Security*, Vol. 8, No. 1, 1983, pp.142-143.)

¹⁶⁸ Bjerke, S., *The Environment and Security in the North Atlantic Region* (speech at a conference, published on the internet), Reykjavik, 7 September 1995, p. 1.

c. Recommendations

In order to counteract new threats, the United States and other major powers of the world must focus on problem-orientated solutions to these issues. Historically, changes concerning the term security take place based on the respective situation. Security has not been an unchangeable and static term in the past.

Whatever the circumstances facing us, we must refashion strategies and establish new and different priorities to suit new conditions. In essence, we must redefine what our National Strategy is and the process redefine what constitutes National Security.¹⁶⁹

In this context, there is perhaps a new role of leadership for the United States after the Cold War. This role can evolve - perhaps the United States efforts as the worlds greatest power will offer in this role a valuable contribution, to prevent emerging new sources of threat and initiate the process of turning the perception of security from national interest to a more global oriented human interest. So long as a world organization is not fully equipped with adequate institutional power to tackle these problems efficiently, it should be a challenge for the major powers to deal with these new "Third-Millennium-Problems."

The whole notion of security as traditionally understood - in terms of political and military threats to national sovereignty - must be expanded to include the growing impacts of environmental stress - locally, nationally, regionally, and globally. There are no [traditionally] military solutions to 'environmental insecurity'.¹⁷⁰

B. SPECIFIC MEASURES AS PART OF A GLOBAL SYSTEM PREVENTING ECOLOGICAL SOURCES OF THREAT

... international and multilateral policies deserve particular attention because of the international dimension inherent in environmental threats to security. Designing appropriate international organizations and effective international agreements related to the environment as well as building capacities through

¹⁶⁹ Ambassador Rodney Kennedy-Minott, Environmental Degradation as a National Security Problem: The Navy, Naval Postgraduate School, Monterey, CA, p. 1.

¹⁷⁰ The World Commission on Environment and Development (ed.), Our Common Future, Oxford University Press, Oxford, New York, 1987, p. 19.

multilateral policies are the main policy options in this respect that need to be further investigated.¹⁷¹

For prevention and combating ecologically induced causes for conflict and conflicts the need is a comprehensive integral system. Such a system requires:¹⁷²

- Managing parts of our worldwide resource basis and problems of ecological degradation can contribute to sustainability. Failure in sustaining our resource basis and living standards may cause potential of conflict.
- In order to prevent and settle ecologically induced conflicts certain mechanisms of compensation should be increasingly used and searched for.
- Many actors with many interests are playing roles in the system. To coordinate these often different interests and to minimize ecologically induced causes for conflict international institutional capacities equipped with appropriate responsibilities basing on improved principles and international ecological law are required.
- Multilateral diplomacy and regime building are important elements contributing to the process of searching for solutions and preventing and deconflicting ecological disputes among the actors. They can create the basis for legitimization and institution-building.
- Together the demand for worldwide management of certain resources, supranational institutions, strengthening of ecological international law indicates a need for modification of state sovereignty.
- And in fact most of ecologically induced conflicts take place in developing countries. Socio-economic and technical capacities are often not sufficient to get the ecological problems solved by themselves. Measures regarding foreign aid are useful to alleviate ecologically induced causes for conflict in these parts of the world.

¹⁷¹ Ecologic-Centre for International and European Environmental Research, Potsdam Institute for Climate Impact Research, Berlin, (ed.), NATO CCMS Pilot Study, Environment and Security in an International Context. State of the Art and Perspectives, Interim Report, October, 1996, p. 2.

¹⁷² Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung*, Abschlußbericht des Environment and Conflicts Project ENCOP, Band I, Verlag Rüegger AG, Chur/Zürich 1996, p. 342.

A comprehensive interacting system on global as well as on regional and national level is required. Development of strategies on different levels does not lead to any contradiction. National, regional and global strategies are complementary and not contradictory because national or regional harmful ecological transformation can affect the whole world (for example emission of greenhouse gases).

In this chapter the global level will be stressed because it seems more reasonable to choose a top down approach. Many ecological problems are characterized by a global dimension. This study attempts to find approaches that may be useful for dealing and preventing the increasing ecologically induced causes for conflicts.

1. Improvement of International Ecological Law

... [I]f global environmental security is taken to mean severity against those risks that threaten our common survival, the focus of collective legal action may indeed be sharpened considerably.¹⁷³

Although more than 170 agreements still exists to protect the environment and minimize ecological disputes, new innovative approaches are necessary.¹⁷⁴

The existing methods are slow, cumbersome, expensive, uncoordinated and uncertain. Something better must be found if the environmental challenges the world faces are to be dealt successfully, we still lack the institutional and legal mechanisms to deal effectively with transboundary and biospheric environmental degradation.¹⁷⁵

Negotiating instruments is most often conducted in different ways. Very often, even the treatment of common elements is different. Available methods and techniques are not apt to create the required instruments of international law that can solve the problems efficiently.¹⁷⁶

¹⁷³Palmer, G., New Ways to Make International Environmental Law, in: American Journal of International Law, Vol. 86, No. 2, April, 1992, p. 260.

¹⁷⁴French, H. F., Wirksame Gestaltung von Umweltschutzabkommen, in: Spektrum der Wissenschaft, No. 2, February, 1995, p. 62. - see also: appendix concerning significant agreements on a global level.

¹⁷⁵Stockholm Declaration on the Human Environment, adopted by the UN Conference on the Human Environment at Stockholm, June 16, 1972; quoted from: Palmer, G., New Ways to Make International Environmental Law, in: American Journal of International Law, Vol. 86, No. 2, April, 1992, p. 259.

¹⁷⁶Palmer, G., New Ways to Make International Environmental Law, in: American Journal of International Law, Vol. 86, No. 2, April, 1992, pp. 263-264.

Customary international law does offer some modest protection for the environment.¹⁷⁷

Along with the increasing awareness of environmental problems, customary law in the environmental area is more widely accepted. This law still lacks the strength to cope with the environmental challenges. Law does not provide sufficient sanctions and is not a regulatory system.

... [L]imitations of custom evidence the need for development of new institutions, standards and localized regimes.¹⁷⁸

Regimes can contribute to a build-up of political and juridical legitimacy.¹⁷⁹

A politically attractive approach is the soft law option. Most often it is only a series of statements or values (for example Stockholm Declaration, Agenda 21) which can create a climate of common agreement and establish in the long run hard law instruments.

Soft law is where international law and international politics combine to build new norms.¹⁸⁰

Shaping the amendments of the Montreal Protocol was very helpful. Although the standards usually are tremendously vague, environmental soft law makes up a vital part in building legal norms.

The development of conventional law takes time and has to be negotiated and ratified. This can be very time consuming because of the requirement of unanimous consent (for example, Antarctic Treaty).

Indications that a state can be bound without its consent do not appear in the Vienna Convention, but some limited exception ... is afforded ..., which makes

¹⁷⁷ Brownlie, A., A Survey of International Customary Rules of Environmental Protection, 13 Nat. Resources J. 179, 1973; quoted from: Palmer, G., New Ways to Make International Environmental Law, in: American Journal of International Law, Vol. 86, No. 2, April, 1992, p. 264.

¹⁷⁸ Palmer, G., New Ways to Make International Environmental Law, in: American Journal of International Law, Vol. 86, No. 2, April, 1992, p. 266.

¹⁷⁹ Brunnée, J.; Toope, J., Environmental Security and Freshwater Resources: Ecosystem Regime Building, in: American Journal of International Law, 1997, p. 58. - concerning regimes See: 6. Multilateral Diplomacy - Intensification of Cooperation, p. 100.

¹⁸⁰ Palmer, G., New Ways to Make International Environmental Law, in: American Journal of International Law, Vol. 86, No. 2, April, 1992, p. 269.

provision for agreements to modify multilateral treaties between certain parties only.¹⁸¹ (for example Montreal Protocol)

There have been "non-traditional" rule-making techniques conducted by several international organizations (for example International Labor Organization). Although these new rule-making techniques cannot establish a world legislature:

... they do have clear applicability to global environmental problems The proleptic method of avoiding the rule of unanimous consent has already been employed in the environmental sphere in the Montreal Protocol ...¹⁸²

Referring to the Montreal Protocol, a two thirds majority can make a decision to establish stronger agreements. This rule of decision-making, influences often hesitating states to agree, otherwise they are confronted with the fact to become outvoted.¹⁸³

The Hague Declaration from 1989 was already calling for the:

... development of new principles of international law including new and more effective decision-making and enforcement mechanisms.¹⁸⁴

This lays the basis for the requirement of a legalistic approach to international environmental issues. Limiting national sovereignty due to ecologically induced trans-border threat the creation of international legitimization would be necessary. But many questions have not been answered.

In fact international environmental law lack strength and sufficient sanctions¹⁸⁵ and requires an improvement of its status. Agreements concerning conservation are too moderate and do not do justice to the extent of the problems. The principle that the party responsible is

¹⁸¹ Palmer, G., New Ways to Make International Environmental Law, in: American Journal of International Law, Vol. 86, No. 2, April, 1992, p. 272.

¹⁸² Palmer, G., New Ways to Make International Environmental Law, in: American Journal of International Law, Vol. 86, No. 2, April, 1992, p. 274.

¹⁸³ French, H. F., Wirksame Gestaltung von Umweltschutzabkommen, in: Spektrum der Wissenschaft, No. 2, February, 1995, p. 63-64.

¹⁸⁴ Hague Declaration on the Environment, March 11, 1989; quoted from: Palmer, G., New Ways to Make International Environmental Law, in: American Journal of International Law, Vol. 86, No. 2, April, 1992, p. 277.

¹⁸⁵ For instance, trading restrictions and incentives; sanctions and incentives in terms of pricing and determination of quantities (See: Simonis, U., Kooperation oder Konfrontation: Chancen einer globalen Klimapolitik, in: Politik und Zeitgeschichte, Vol. 16, No. 4, 1992, p. 25.).

liable for the damages must be stressed. Concerning this aspect, the world community lacks international consent. In comparison to the human rights codifying the principle that the party responsible is liable for the damages could be a comparable legal norm and a first step to an ecological charter.

The realization of all these recommendations depends on the establishment and recognition of an international institution by the world community. This means also a transfer of responsibilities and power from the sovereign states to this new institution and pose the question of financing of this institution. The Global Environment Facility (GEF) may serve as an instrument of financing. Especially the capabilities of the developing countries are limited in financial terms and demands for additional funding.¹⁸⁶

Although international environmental law encompasses thirty volumes, obviously its quantity does not mean efficiency.¹⁸⁷ Persuading a number of nations, reaching consent on certain objectives and creating an agreement, and putting the agreement into force is still a major undertaking¹⁸⁸

¹⁸⁶French, H. F., *Wirksame Gestaltung von Umweltschutzabkommen*, in: *Spektrum der Wissenschaft*, No. 2, February, 1995, pp. 64-65.

¹⁸⁷Bächler, G., *Ökologie und Sicherheit*, in: *Forschungstelle für Sicherheitspolitik und Konfliktanalyse ETH Zürich* (ed.), *ETH-Bulletin zur schweizerischen Sicherheitspolitik*, Zürich, 1991, pp. 86-87.

¹⁸⁸In 1992, on the Earth Summit in Rio de Janeiro more than 150 states agreed on the necessity of sustainable development and the Agenda 21 (a kind of soft law with political statements and recommendations). But "[f]ive years after the Earth Summit, with all its promise for attacking global ills, forests still disappear, the air is murkier than ever and the population is up almost half a billion people." On the one hand the Worldwatch Institute, editor of the report 'State of the World', and the former secretary-general of the Earth Summit in 1992 are seeing poor improvement, on the other hand the U.S. and World Bank officials mean that the trend of decline was reversed. The Worldwatch Institute declared that only few governments took measures "... to put the world on an environmentally sustainable path Among Worldwatch's gloomiest conclusions: Millions of acres of tropical and deciduous forest still disappear each year; carbon dioxide emissions are at record highs; and population growth is outpacing food production." Maurice Strong, the former secretary-general of the Earth Summit, made the statement in January that far too few meet the standards to ensure sustainable development. This background shows even more the necessity to think about other preventive measures. The Assistant Secretary of State dealing with environmental affairs noted, that Congress slashed funding for the summit's major initiatives. "The United States, like other industrial countries, is already experiencing difficulties reducing its own emissions of carbon dioxide from burning fossil fuels. It will be very complicated persuading 153 nations to agree on how strict any new controls should be and on how they should be put into force." The climate change treaty signed at the Earth Summit aimed at reducing greenhouse gases within industrial countries by the year 2000 to the levels of 1990. This objective was not a legal binding agreement and only a few countries have met it. Now measures to control the growth of greenhouse gases should be lowered and expanded beyond the year 2000. U.S. officials attempt to set new deadlines not before 2010. See: Briscoe, D. (Associated Press), 'State of the World' report gloomy, Group says

Unless we devise a better way to make international law for the environment, future progress is likely to be piecemeal, fitful, unsystematic and even random.¹⁸⁹

2. Modification of State Sovereignty

One of the significant consequences of an improvement of international law would be an surrender of sovereignty. At least partially, rights must be handed over to an international institution which is capable of initiating, realizing, monitoring and verifying compliance with new agreements and international management.

Environmental degradation knows no national boundaries. Sulfur emissions in one country cause acid rain in another downwind. Depletion of the ozone layer from CFCs used in one nation can lead to skin cancer on the other side of the world. In an increasingly interdependent world, the United Nations has a crucial role to play, in protecting the global environment and promoting sustainable development.¹⁹⁰

Who surrenders whose sovereignty in coping with trans-boundary destabilizing factors caused by environmental degeneration involving water access, nuclear fallout, or toxic waste in territorial waters subject to tidal forces? This remains the most complex and divisive problem, and very little study has been given to it.¹⁹¹

The quotations show that ecologically threat is dominated by its trans-boundary character and incongruity of state and ecoregional territory.¹⁹² However, political rule in the modern state system is bound to exactly defined spatial areas. Territoriality is the principle of

environmental ills worse since Earth summit, in: *The Sunday Herald*, January 12, 1997, p. A6. - Cushman Jr., J.H. (The New York Times Service), U.S. wary on global warming, in: *The Sunday Herald*, December 8, 1996, p. A2.

¹⁸⁹ Palmer, G., New Ways to Make International Environmental Law, in: *American Journal of International Law*, Vol. 86, No. 2, April, 1992, p. 259.

¹⁹⁰ UN Department of Public Information (ed.), *The United Nations: Protecting the Global Environment*, DPI/1814 (published on the Internet), April, 1996, p. 1.

¹⁹¹ Ambassador Rodney Kennedy-Minott, *Environmental Degradation as a National Security Problem: The Navy*, Naval Postgraduate School, Monterey, CA, p. 3.

¹⁹² Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung*, Abschlußbericht des Environment and Conflicts Project ENCOP, Band I, Verlag Rüegger AG, Chur/Zürich 1996, pp. 44-45.

political systems and organizations and therefore practice of state sovereignty.¹⁹³ Until now, the political-territorial dimension of trans-boundary ecological problems has been considered only occasionally. This especially concerning relativity and division of state sovereignty.¹⁹⁴

The consequences of the incongruity can be an increasing potential of ecological causes for conflicts. But ecological causes need not be a determining factor in inducing conflicts necessarily. Usually the problem will evolve to an acute conflict if there is a conflict of interests and needs between two different parties and this conflict cannot be solved (for example disputes between upper-/down-stream riparian along river flows). If the ecoregional determination will actually lead to a violent conflict, depends on the behavior of the actors and their capacities of conflict prevention and settlement.¹⁹⁵ However, against this background:

[e]nvironmental strains that transcend national borders are already beginning to break down the sacred boundaries of national sovereignty, ...¹⁹⁶

In attempting to solve ecological problems, it must be realized that it is possible to come up against limiting factors if sovereignty should remain untouchable. The success of supranational institutions, international law with a more legally binding character and the new models of diplomacy are tightly connected with the willingness to hand over national sovereign rights to these higher levels.¹⁹⁷ Nevertheless, until today:

..., arguments about sovereignty are used unhesitatingly by political decision makers to tell decision makers of other nations to keep out of matters that are

¹⁹³ Müller, H., Umwelt und Konflikt, in: Meyer, B., Wellmann, C. (ed.), Umweltzerstörung: Kriegsfolge und Kriegsursache. Friedensanalysen, No. 27, Frankfurt/M., p. 78; quoted from: Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung, Abschlußbericht des Environment and Conflicts Project ENCOP, Band I, Verlag Rüegger AG, Chur/Zürich 1996, p. 43.

¹⁹⁴ Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung, Abschlußbericht des Environment and Conflicts Project ENCOP, Band I, Verlag Rüegger AG, Chur/Zürich 1996, p. 43.

¹⁹⁵ Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung, Abschlußbericht des Environment and Conflicts Project ENCOP, Band I, Verlag Rüegger AG, Chur/Zürich 1996, pp. 43-46.

¹⁹⁶ Mathews, J. T., Redefining Security, in: Foreign Affairs, Vol. 68, No. 2, 1989, p. 162.

¹⁹⁷ French, H. F., Wirksame Gestaltung von Umweltschutzabkommen, in: Spektrum der Wissenschaft, No. 2, February, 1995, pp. 65-66.

not their business. [A scholar mentioned] ... the 'incubus' of sovereignty still sits heavily upon the body of international law.¹⁹⁸

Sovereignty represents the basic constitutional doctrine of the law of nations. Also, it is understood that sovereignty was created in the past¹⁹⁹ when nobody thought of threats of a global dimension and ecologically induced causes for conflict that could affect sovereign states. That means the states must accept changes to meet new challenges that are already present and will be part of their future.

To establish an international set of rules to deal effectively with ecological problems these obstacles must be overcome. These obstacles lag behind reality.²⁰⁰ Although the activities concerning a "New World Order" were reversed after 1993 and sovereignty was backed up,²⁰¹ surrender of parts of sovereignty is a necessity. For example, to monitor the climate as the common heritage of humanity and a possible cause for conflict (See: Overview about ecological sources of threat, p. 24).²⁰² In this perspective, sovereignty will become relative, especially in such ecological questions.²⁰³ The former UN Secretary General Boutros Boutros-Ghali said:

The time of absolute and exclusive sovereignty, however, has passed; its theory was never matched by reality. It is the task of the leaders of states today to

¹⁹⁸ Brierly, J., *The Law of Nations*, 6th ed., 1963, p. 47; quoted from: Palmer, G., *New Ways to Make International Environmental Law*, in: *American Journal of International Law*, Vol. 86, No. 2, April, 1992, p. 271.

¹⁹⁹ The basis for the sovereign state system was established by the Treaty of Westfalia in 1648 and the Treaty of Utrecht in 1713.

²⁰⁰ Palmer, G., *New Ways to Make International Environmental Law*, in: *American Journal of International Law*, Vol. 86, No. 2, April, 1992, p. 271.

²⁰¹ Patenaude, B.M., *International Law and International Organizations*, lecture given at the U.S. Naval Postgraduate School, Monterey, CA, April 14, 1997. - Crossette, B., *What is a Nation? Chechnya Case Revives U.N. Debate about Sovereignty and Minorities*, in: *New York Times* (Special to the New York Times), November 26, 1994, Y 5.

²⁰² Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung*, Abschlußbericht des Environment and Conflicts Project ENCOP, Band I, Verlag Rüegger AG, Chur/Zürich 1996, p. 348.

²⁰³ *Ibid.*, p. 43-46. - French, H. F., *Wirksame Gestaltung von Umweltschutzabkommen*, in: *Spektrum der Wissenschaft*, No. 2, February, 1995, p. 66.

understand this and to find a balance between the need of good internal governance and the requirements of an evermore interdependent world.²⁰⁴

3. Institution - Building

Nation-states are not the only actors that play important roles in global environmental politics. International organizations help to set the global environmental agenda, initiate and mediate the process of regime formation, and cooperate with developing countries on projects and programs directly affecting the environment. Nongovernment organizations also participate in setting the agenda, influencing on regime formation, and shaping the environmental policies of donor agencies toward developing countries. Multinational corporations both participate in the bargaining of regime creation and carry out actions that directly affect the global environment.²⁰⁵

Although, the state actors play an important role, this chapter focuses on the international organizations and the non-government organizations. Crucial ecological problems are most often beyond the state-level and require international solutions. The findings concerning the Central Asian region, the demands for realization and verifying compliance of international ecological law and international management of resources indicate a need for international institution-building. Therefore, the focus in this chapter is on international organizations and non-government organizations.

Four things [are new]: The timing; the range of the security problems that we are now going to have to engage; the institutional demands that those two first requirements will set; and finally, the analytic requirement that must underlie any sort of robust institutional transformation.²⁰⁶

The adaptation of existing institutions to new tasks reflects the new approach to new challenges.²⁰⁷

²⁰⁴ Quoted from: Crossette, B., What is a Nation? Chechnya Case Revives U.N. Debate about Sovereignty and Minorities, in: New York Times (Special to the New York Times), November 26, 1994, Y 6.

²⁰⁵ Porter, G., Brown, J. W., Global Environment Politics, 2nd edition, Westview Press, Boulder, 1991, p. 35.

²⁰⁶ Prins, G., Die sicherheitspolitischen Herausforderungen des 21. Jahrhunderts, in: NATO Brief, Januar, 1997, p. 27.

²⁰⁷ Bjerke, S., The Environment and Security in the North Atlantic Region (speech at a conference, published on the internet), Reykjavik, 7 September 1995, p. 2.

There are many existing institutions (for example FAO, GEF, UNDP, IPCC, etc.) and conventions, dealing with ecological aspects²⁰⁸. Often, there seems to be a lack of capability in coordinating specific activities. For instance, the institutions of the UN dealing with ecological problems report to the Economic and Social Council.

The Economic and Social Council has the task of coordinating all these diffuse efforts and it is fair to say that the task has not been accomplished.²⁰⁹

An ecological (security) council operating on the basis of the Earth Charta (statement of 27 principles for balancing ecological protection, economic development, ethical standards) does not exist.²¹⁰ Such a council may consist of the heads of the states and should be given the authority to make decisions including formal enforcement and financing abilities. After the Earth Summit in Rio de Janeiro in 1992 (See: footnote 188), some institutional reform took place to enhance the importance of environmental considerations in international policy-making. With the establishment of the Commission of Sustainable Development (CSD)²¹¹ the hope was that this was the beginning of the solution to solve the problems of coordinating different global policies and institutions relevant to ecology. Although, the CSD effort was a valuable contribution, CSD did not make decisive progress in solving the coordination problem.²¹²

To ensure a global approach for carrying out effective coordination, monitoring and assessment concerning climate change, water quality or biodiversity etc., an international institution for ecological security should be created. This institution should have appropriate power and authority.²¹³ The question is, should it be a new institution or an already existing

²⁰⁸ See: Appendix

²⁰⁹ Palmer, G., New Ways to Make International Environmental Law, in: *American Journal of International Law*, Vol. 86, No. 2, April, 1992, p. 261.

²¹⁰ Hall, B. W., The Tragedy of the Commons and UN Responses to Environmental Problems, <http://www.ear/ham.educar/hamcollege/polisci/environment.html>, February, 1996, p. 4.

²¹¹ See: Appendix

²¹² Ecologic-Centre for International and European Environmental Research, Potsdam Institute for Climate Impact Research, Berlin, (ed.), NATO CCMS Pilot Study, Environment and Security in an International Context, State of the Art and Perspectives, Interim Report, October, 1996, p. 20.

²¹³ French, H. F., Wirksame Gestaltung von Umweltschutzabkommen, in: *Spektrum der Wissenschaft*, No. 2, February, 1995, pp. 65-66.

institution? Some prefer the strengthening of existing institutions especially UN institutions (See Figure 18), for instance the UNEP. Other asserted that without a new established institution progress will be too slow and unsystematic. A new organization with clear lines of jurisdiction and new powers is required from their perspective.²¹⁴

The Barents Cooperation²¹⁵ as a new regional institution in the Barents Euro-Arctic Region is a unique example of cooperation (only regional) between East and West after the Cold War. This regional institution has fundamental implications for security in a broader sense and a unique character concerning the kind of organization.

Much of the initiative and momentum is in the hands of the Regional Council, which is now a well-established political institution consisting of the political leaders of the region.²¹⁶

The strengthening of the UNEP and giving to it an appropriate status is an often mentioned approach to a global initiative. This is because of its engagement and involvement in many ecological initiatives since the Stockholm Conference.²¹⁷

[It] ...is the only global international organization exclusively in charge of environmental issues.²¹⁸

Due to its increasing value and reputation UNEP:

...might provide a useful forum for reaching global environmental decisions at a far higher political level than anything that exists now.²¹⁹

²¹⁴ Palmer, G., New Ways to Make International Environmental Law, in: American Journal of International Law, Vol. 86, No. 2, April, 1992, p. 282.

²¹⁵ Personal communication with Minister-Counselor Dr. J. Livonen and Defense Attaché COL K. J. Kokkonen, Embassy of Finland, May 20, 1997.

²¹⁶ Bjerke, S., The Environment and Security in the North Atlantic Region (speech at a conference, published on the internet), Reykjavik, 7 September 1995, p. 5.

²¹⁷ "... UNEP played a role in helping to coordinate about 170 environmental treaties." (Hall, B. W., The Tragedy of the Commons and UN Responses to Environmental Problems, <http://www.ear/ham.eduear/hamcollege/polisci/environment.html>), February, 1996, p. 3.) - See also appendix and UNEP's involvement in different projects and its coordinating function.

²¹⁸ Ecologic-Centre for International and European Environmental Research, Potsdam Institute for Climate Impact Research, Berlin, (ed.), NATO CCMS Pilot Study, Environment and Security in an International Context, State of the Art and Perspectives, Interim Report, October, 1996, p. 19.

²¹⁹ Mathews, J. T., Redefining Security, in: Foreign Affairs, Vol. 68, No. 2, 1989, p. 176.

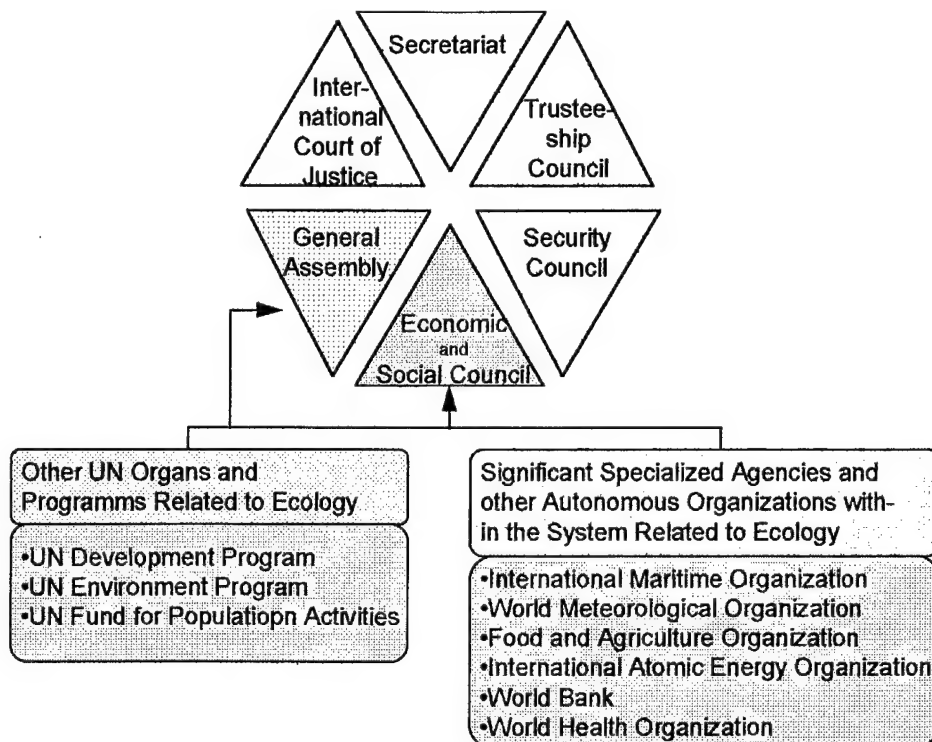


Figure 18. The United Nations System - Organs and Programs Related to Ecological Issues²²⁰

UNEP is seen:

... as the principle source of environmental data, assessment and reporting and as an advocate of change and cooperation. It was to be the lead UN agency in restoring, protecting and improving the ecological basis for sustainable development.²²¹

Another approach is the reactivating the UN trusteeship for managing the global commons (for example atmosphere, biodiversity, oceans). An international institution has to be empowered. The already existing UNEP (may be together with the Earthwatch-Program) can

²²⁰ Bennett, A. L., *International Organizations. Principles and Issues*, 6th edition, Englewood Cliffs, New Jersey, 1995, p. 63.

²²¹ Palmer, G., *New Ways to Make International Environmental Law*, in: *American Journal of International Law*, Vol. 86, No. 2, April, 1992, p. 261.

be the basis for the foundation of an institution.²²² Preconditions are the equipment with the appropriate power and responsibilities of such an institution.

What is interesting is how infrequently positive reference is made to the global institution - with all its defects and benefits - of the United Nations. That becomes important, because if we are going to achieve what Guido Lenzi of the Western European Union (WEU) calls 'participatory multilateralism', based not only on shared values but also on shared interests, then we are going to have to think about using the whole of this spectrum of institutions.²²³

In the interim phase until the establishment of such a world-institution is realized a small group of the major powers, for example the Group of Seven (possibly enlarged) could play an appropriate role.²²⁴ Within this forum the U.S. could play a new role of leadership, for example, initiating the creation of new environmental regimes. The already established bilateral agreements can be seen as a starting point and direction.²²⁵ Until a world institution is established, G 7 may be the right forum because:

...global environmental regimes cannot be divorced from the complex of trade, investment, security, and other regimes involving the advanced market economy countries, they are not simply "nested" within the complex of those regimes.²²⁶

Furthermore, besides a world institution, institutions on a regional level have to be created. These institutions operate above the nation level and are supposed to deal with respective ecological problems on a regional level, for example, the Intergovernmental Coordination Committee for Water Supply in Central Asia. In this context new fields of activity

²²²Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung. Abschlußbericht des Environment and Conflicts Project ENCOP, Band I*, Verlag Rüegger AG, Chur/Zürich 1996, pp. 349-350.

²²³Prins, G., *Die sicherheitspolitischen Herausforderungen des 21. Jahrhunderts*, in: NATO Brief, Januar, 1997, p. 30.

²²⁴See: Figure 23. "Imaginable Global View" to Prevent Future Ecologically Induced Conflicts, p. 114.

²²⁵See: Appendix and the involvement of the U.S. in many bilateral agreements.

²²⁶Keohane, R. O., *The Demand for International Regimes*, in: *International Organizations* 36, 1982, p. 334; quoted from: Porter, G., Brown, J. W., *Global Environment Politics*, 2nd edition, Westview Press, Boulder, 1991, p. 26.

arise for existing regional oriented institutions as NATO²²⁷, OCSE²²⁸, ASEAN, OSA etc. Such institutions may take on a part of tasks and responsibilities for the respective region in a worldwide created network of ecological security supervised by a global institution (See Figure 19).

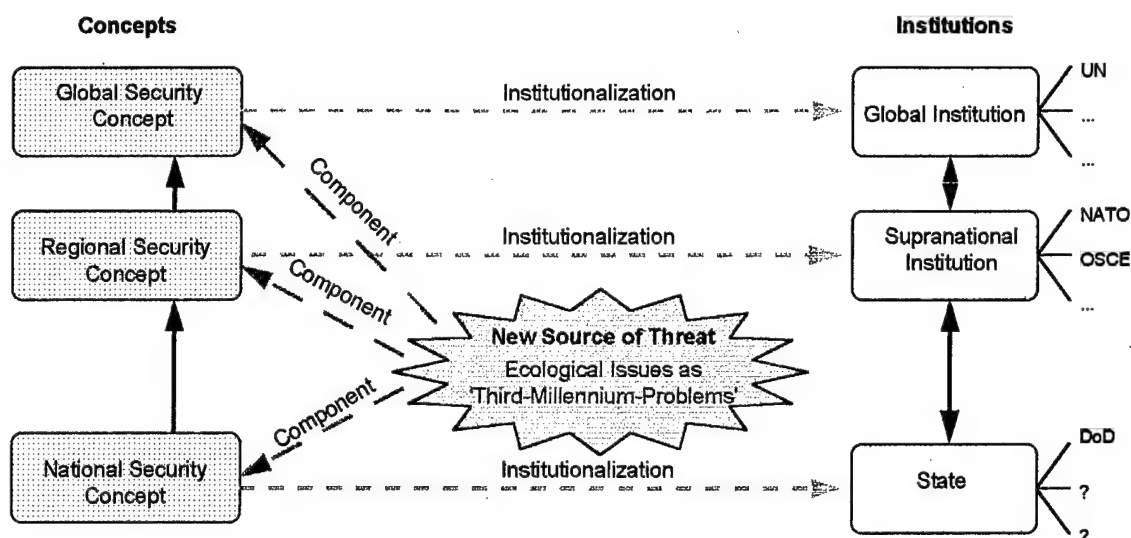


Figure 19. Institutionalization and Conceptual Incorporation of Ecological Aspects

The focus has been on different levels because on all levels, problems can arise and different measures may be required to solve the problems. Problems within a region may consist of a different quality and need not have reached the level to require measures of a global dimension. The opposite may be that the regional measures are not far reaching enough to attain the goals. Thus, global activities are required, for example, the creation of quotas

²²⁷ "...NATO, as an organization for the provision of common security to its members, is especially interested in identifying possible environmental threats to international security." (Ecologic-Centre for International and European Environmental Research, Potsdam Institute for Climate Impact Research, Berlin, (ed.), NATO CCMS Pilot Study, Environment and Security in an International Context, State of the Art and Perspectives, Interim Report, October, 1996, p. 7.) NATO's engagement in this field of activities led NATO appear as a potential institution capable to deal with an enlarged spectrum of activities as above mentioned. Also NATO is willing to support other institutions playing respective roles in this area, See: footnote 228.

²²⁸ During the NATO-Summit in January 1994, in Brussels, in the declaration of the heads of the state and Government was stated: "We remain deeply committed to further strengthening the CSCE, which is the only organization comprising all European and North American countries, as an instrument of preventive diplomacy, conflict prevention, cooperative security, and the advancement of democracy and human rights." (Declaration of the Heads of the States and Government, NATO-Summit, Brussels, January, 1994, par. (10))

concerning the emissions of greenhouse gases. In this context the above mentioned institutions can take over functions of control and monitoring.

Also non-government organizations seem to have made for this job, presupposed respective data and activities are revealed.²²⁹ The engagement and support of non-government organizations (e.g. "Friends of the Earth", International Union for the Conservation of Nature) and grass-root groups are immense. In the Worldwatch report is mentioned:

... more than 1,500 cities in 51 countries have adopted local plans and rules, often more stringent than their national governments proposed at Rio, ...²³⁰

The former Secretary General of the Earth Summit founded the "Earth Council" as a non-government organization. Due to environmental activism by grassroots organizations he expects more pressure on the governments and the necessity of pay more attention to environmental problems.²³¹

A special UN session in June this year is planned:

... to review how well dozens of agreements of air and water pollution, for example, have been carried out.²³²

[called Rio Plus 5]

... to monitor the implementation of Agenda 21 and to do that [the former Secretary-General of the summit held] its own Rio plus 5 forum in Rio de Janeiro [in] March ...,²³³

Non-government organizations can help to a large extent in solving and respectively pointing out the problems and are often more successful in distributing funds and directing programs.

²²⁹French, H. F., *Wirksame Gestaltung von Umweltschutzabkommen*, in: *Spektrum der Wissenschaft*, No. 2, February, 1995, pp. 63-64.

²³⁰Briscoe, D. (Associated Press), 'State of the World' report gloomy, Group says environmental ills worse since Earth summit, in: *The Sunday Herald*, 12 January 1997, p. A6.

²³¹Stilkind, J., *Governments Faulted as Doing Little to Protect Environment*. Special United Nations Session on Issue in June, in: *USIA* (ed.), published on the internet, January 9, 1997, p.1.

²³²*Ibid.*

²³³*Ibid.*

4. International Management

[W]e must collaboratively manage our global natural resource base which sustains the potential for growth and opportunity for present and future generations. Failure to do this perpetually leads to resource depletion, to higher costs for basic necessities, and to lower living standards, until people either starve, move to confrontation and conflict, or migrate to another region. Although resource depletion, lower living standards and conflicts may be small and localized at first, they will spread if gone unchecked. There is ample evidence of this in the past and we are only just beginning to understand the spread of conflict among interwoven and interdependent communities, ... [e.g. Middle East].²³⁴

The Central Asian region as an ecoregion is an example of several states that depends on certain natural and common resources within a region. To prevent and settle conflicts within the Central Asian region requires international management especially for water. After becoming independent states it was necessary to create international institutions that can manage the shared resources.

With an extended definition of inland waters as water systems, basins, characterized by geographical and ecological aspects, it becomes clear that water management cannot be bounded to state borders and international rules are required. Today, the following three principles are valid and referred to: principle of absolute sovereignty, principle of absolute integrity, and the principle of limited sovereignty because of consideration of other states.

The development of an international water law ("Helsinki Rules") tried to overcome tensions inherent in these principles. The international water law addresses the third principle ("equitable apportionment and utilization-doctrine"). The current activities in creating an international legally binding system of reasonable water management and enforceable water law gives an example for the build-up of a specific international management regional as well as

²³⁴ Waddell, J., "Remarks", Seminar on Geostrategic Concerns and Environmental Issues (The Hoover Institution, Stanford University Stanford, Stanford, CA, March, 1992, quoted from: Ambassador Rodney Kennedy-Minott, Environmental Degradation as a National Security Problem: The Navy, Naval Postgraduate School, Monterey, CA, p. 8.

global oriented management. International management may also be required, for example, in the case of climate change, to sustain our atmosphere and reduce greenhouse gases.²³⁵

Different approaches, demand side as well as supply side measures can contribute to a partial solution of the problem. This means on the demand side, for example, slowing the growth of demand by slowing the growth of population. Population growth, especially in the developing countries and the behavior of consumption are causes for harmful ecological transformation induced by human activities. Although, these aspects are very important in a long term view, they cannot be addressed in this study. Decreasing the population growth and changing behavior of consumption is such a complex theme that it requires a separate examination.

The introduction of mechanisms of the free market can support demand side as well as supply side management. Pricing goods and services to reflect the environmental costs of their provision and quasi taxes can lead to more consciousness in using ecological media.²³⁶ With specific regard to these points the principle that the party responsible is liable for the damage must be more stressed. Countries with large harmful emissions may be charged for this - perhaps in the way raising ecological taxes that have to be paid to an international institution responsible for global management.²³⁷

Premise for this procedure and political instrument would be a regulatory system of quota, for example, the limitation of utilization of water resources²³⁸ or the reduction of harmful emissions. In the case of emissions, this would mean as a first step the industrialized countries would be pressed to decrease their emissions drastically. Conflicts concerning the allocation of quota cannot be ruled out.

²³⁵ Barandat, J., Wasser, Regionaler Konfliktstoff weltweiter Bedeutung, in: Institut für Friedensforschung und Sicherheitspolitik an der Universität Hamburg (IFSH), Hamburger Beiträge zur Friedensforschung und Sicherheitspolitik, Heft 96, Hamburg, November, 1995, pp. 9-12.

²³⁶ May be one should think about taking into account resource depletion and ecological degradation in gross national products. (Mathews, J. T., Redefining Security, in: Foreign Affairs, Vol. 68, No. 2, 1989.)

²³⁷ Müller, F., Internationale Konflikte durch Umweltgefährdung, in: Europa-Archiv, Folge 16, 1993, pp. 479-480.

²³⁸ See: Disputes over Common Shared Irrigation Systems/Water Resources, p. 41.

Substitutes should be developed for nonrenewable resources. Stockpiles on international level could be created decreasing the vulnerability to resource shortages. To combat the exploitation of renewable resources beyond their capacity, mechanisms could be established for effective regulation of the rate at which forests are cut, fish are caught etc.

The only efficient way is to deal with both the demand and the supply side.²³⁹ In order to attain and ensure this goal there must be a turning away from a pure optimization of allocation. The establishment of an international management and appropriate institutions is necessary to initiate and realize agreements that implement this goal.

A simultaneous strengthening of all management elements on national, regional and international level has to be considered to minimize causes for conflicts and ecological degradation and scarcities on all levels. This includes the development of surveillance strategies, monitoring and verification of ecological treaty compliance as a part of international management.²⁴⁰ The development and coordination of data sharing for monitoring networks on all levels could be the field of activities for international management.

Ecological partnerships between certain countries with the same problems within ecoregions could constitute a first step in international management. Bangladesh cannot prevent floods without the cooperation from Nepal and India. Canada cannot fight acid rain without collaboration with the U.S. These challenges require regional solutions rather than solution for the territory of nation. The controversy ecoregion versus state sovereignty indicates that a limitation of national sovereignty must be debated.

5. Activities of Compensation as Cooperative Mechanisms

Cooperative mechanisms can prevent and settle conflicts in resource scarcities and ecological degradation. Compensation such as confirmation of rights of ownership on one side and granting rights of use on the other side (for example Fergana Valley case: rights of using

²³⁹ Ullman, R. H., *Redefining Security*, in: *International Security*, Vol. 8, No. 1, 1983, p. 144-146.

²⁴⁰ Gore, A., *The Interplay of Climate Change, Ozone Depletion, and Human Health* (Remarks by Vice President Al Gore at the Conference on Human Health and Global Climate Change, National Academy of Sciences), September 11-12, 1995, p. 9) Activities in the field of surveillance can be developed and realized in cooperation with nongovernment organization which are apt for an engagement in this field of activities.

land by the Kyrgyz versus confirmation of rights of ownership to the Uzbek) can contribute to conflict settlement. These mechanisms will be considered more in detail.

A global example is the intensifying debate about biodiversity. With the convention on biodiversity the world community try to ensure sustainability of genetic diversity. In this case a kind of compensation is also applied. The tropical countries have the primary potential in genetic diversity. The industrialized countries are interested in scientific and commercial use of this resource. A planned compensation for the southern countries is for these countries to regulate access and ensure sustainability of resource. The industrialized countries have access to use the resources and in turn provide the tropical countries with new technologies. The purpose of this plan is to ensure profit sharing and sustainability. Genetic resources versus technology and profit sharing should be the formula of compensation.²⁴¹

Instead of seeing biodiversity as a common heritage that should be managed by global stewardship, national interests that stress sovereignty led to the principle of territoriality and respective states are responsible for their resources. In contrast to attain the global management goal, bilateralism is expected to fulfill individual national interests. This bilateralism is dominated by an economic objective. Against this background causes for conflict in this area will probably not decrease but new conflict fault lines will emerge.

In many cases there are difficulties in the applicability of mechanisms of compensation. In these situations a global ecological institution can act as a mediator as well as an initiator. The institution could work out new efficient and functional mechanisms of compensation that may find more acceptance. It could intensify regime-building in this area and may be able to pressure actors into multilateral cooperation. Although this may be an idealistic point of view, international management and cooperative mechanisms seem to be necessary to guarantee the sustainability of certain resources.

²⁴¹ Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung, Abschlußbericht des Environment and Conflicts Project ENCOP, Band I*, Verlag Rüegger AG, Chur/Zürich 1996, pp. 333-341.

6. Multilateral Diplomacy - Intensification of Cooperation

Former Secretary of State, Warren Christopher, defined the U.S. interests with regard to ecological aspects in a speech at Stanford University in 1996 as follows:

Our ability to advance our global interests is inextricably linked to how we manage the Earth's natural resources. We must put environment into the mainstream of American foreign policy."²⁴²

Further activities as annual reports, "Environmental Hubs," from key embassies especially in regions of developing countries were recommended. Conferences on strategies to improve compliance with multilateral environmental agreements were also required.²⁴³

An important object of diplomacy and intensification of cooperation is regime-building. In general, cooperation has to focus on global cooperation, especially cooperation between developing and developed countries. Developed countries must try to increase conservation and attempt to decrease mistrust between both parts of the world. Regimes as a system of norms and rules, specified by a multilateral legal instrument is usually the result of intensive multilateral diplomacy. Regime-building can be used as an example showing the complexity of multilateral diplomacy and the need for multilateral diplomacy and intensified cooperation.

The term regime should be defined as:

... a system of norms and rules that are specified by a multilateral legal instrument among states to regulate national actions on a given issue. The main form taken by multilateral legal instruments on global environmental problems is the convention, which may contain all the binding obligations expected to be negotiated or may be accompanied by a more detailed instrument elaborating on its rules and regulations. If it is negotiated in anticipation of later elaborating texts, it is called a framework convention and is intended merely to provide a set of principles, norms, and goals relating to the issue.²⁴⁴

²⁴² Quoted from: Schick, J., *The Integration of Environmental Issues into U.S. Foreign Policy*, lecture given at the U.S. Naval Postgraduate School, Monterey, CA, 3 April, 1997.

²⁴³ Schick, J., *The Integration of Environmental Issues into U.S. Foreign Policy*, lecture given at the U.S. Naval Postgraduate School, Monterey, CA, 3 April, 1997.

²⁴⁴ Porter, G., Brown, J. W., *Global Environment Politics*, 2nd edition, Westview Press, Boulder, 1991, p. 20.

Usually, the establishment of framework conventions is followed by negotiations of protocols. After that, the stages of bargaining and regime creation will take place. Regime creation requires different lengths of time (e.g. Long-Range Transboundary Air Pollution, framework convention 1979, Helsinki Protocol 1985, Sofia Protocol 1988 - Vienna Convention for the Protection of the Ozone layer 1985, Montreal Protocol 1987, real step toward protecting the ozone layer).

Although, many multilateral instruments may not have the force to regulate certain issues, the rules and norms set a minimum standard for the behavior of the parties. These rules also increase the awareness in crucial issues and contribute to the development of a common sense in dealing with these issues even though they were often originally controversial.

...[B]inding legal norms may emerge from patterns of expectation developed through coordinated discussions and actions of states in given issue-areas.²⁴⁵

There are several examples of international regimes dealing with environmental issues, for example:

... international trade in ... hazardous waste, long-range transboundary air pollution, ozone protection, marine pollution from ships, and the dumping of wastes and other materials in the oceans. These regimes vary widely in their effectiveness, from weak to quite strong.²⁴⁶

One of more successful regimes is the Montreal Protocol. This started as a framework convention to protect the ozone layer in 1985, the parties were not committed to reducing appropriate chemicals. Two years later in the Montreal Protocol a requirement was added to reduce CFCs. In 1990 a decision was made to stop the production of ozone depleting substances, including CFCs by 2000. Further amendments to the regime have strengthened the protocol. Industrialized countries were committed to stop CFC-production beginning in 1996, developing countries have a 10-year grace period to comply.

²⁴⁵ Brunnée, J.; Toope, J., *Environmental Security and Freshwater Resources: Ecosystem Regime Building*, in: *American Journal of International Law*, Vol. 91:26, 1997, p. 28.

²⁴⁶ Porter, G., Brown, J. W., *Global Environment Politics*, 2nd edition, Westview Press, Boulder, 1991, p. 21.

New voting procedures for the Montreal Protocol were negotiated and established. Resolutions need not be passed unanimously.²⁴⁷ The Montreal Protocol is also a precedent for new negotiation models that will be discussed later.

There are different theoretical approaches to explain the establishment and changes of international regimes. The most prominent example after World War II was a structural or hegemonic power approach in which an existent strong state with hegemonic power exercises leadership over weaker states. For regime-building in the environmental area this approach is not likely the case.

The environmental regimes that have been successfully negotiated have depended on wide consensus among a number of states, not on imposition by the United States.²⁴⁸

In the discussion about global warming and ozone depletion another approach is the so-called epistemic communities model. This model plays a significant role in regime building. Technical and scientific specialists and officials of international organizations come together in transnational communities of experts sharing common values and approaches to address policy problems.²⁴⁹

The progress made in combating ozone depletion is a good example. But today not all global environmental issues are addressed sufficiently. Increasing scarcity of fresh water and arable land are not considered enough.²⁵⁰

²⁴⁷ French, H. F., *Wirksame Gestaltung von Umweltschutzabkommen*, in: *Spektrum der Wissenschaft*, No. 2, February, 1995, p. 62. - Porter, G., Brown, J. W., *Global Environment Politics*, 2nd edition, Westview Press, Boulder, 1991, p. 21-22. - UN Department of Public Information (ed.), *The United Nations: Protecting the Global Environment*, DP1/1814 (published on the Internet), April, 1996, p. 2.

²⁴⁸ Young, O. R., *The Politics on International Regime Formation: Managing Natural Resources and the Environment*, in: *International Organizations* 43, Summer, 1989, p. 355; quoted from: Porter, G., Brown, J. W., *Global Environment Politics*, 2nd edition, Westview Press, Boulder, 1991, p. 23.

²⁴⁹ Porter, G., Brown, J. W., *Global Environment Politics*, 2nd edition, Westview Press, Boulder, 1991, p. 24.

²⁵⁰ An article recently published by J. Brunnée and J. Toope. This article considers ecosystem regime-building in the context of fresh water resources and tries to draw together issues of international regime theory and international law. (Brunnée, J.; Toope, J., *Environmental Security and Freshwater Resources: Ecosystem Regime Building*, in: *American Journal of International Law*, 1997.)

New diplomacy and new negotiating models are required as were already applied in the Montreal Protocol. Negotiating models must be improved because current negotiations take too much time to the realization of treaties.

The new model will have to be fluid, allowing a rolling process of intermediate or self-adjusting agreements that respond quickly to growing scientific understanding.²⁵¹

An example for this is the Montreal Agreement:

... one third of the parties can reconvene a science experts group to consider new evidence as it becomes available.²⁵²

That implies a more active political role for biologists and chemists and greater technical and scientific competence of policy-makers. Neither common interests per se nor concepts as sustainable development will improve the chance for international cooperation. A significant prerequisite is the strength of consents within the community of scientific experts. This community can determine the spectrum of political alternatives, for example, regarding the negotiations about ozone depletion.²⁵³

In the past, tremendous efforts in the field of diplomacy has been made to achieve multilateral instruments. Extensive multilateral diplomacy is required to make treaty law (See Figure 20). The reason this effort is required is the requirement of unanimous consent that leads usually to the lowest common denominator.²⁵⁴

²⁵¹ Mathews, J. T., Redefining Security, in: Foreign Affairs, Vol. 68, No. 2, 1989, p. 176.

²⁵² Ibid., p. 176.

²⁵³ Simonis, U., Kooperation oder Konfrontation: Chancen einer globalen Klimapolitik, in: Politik und Zeitgeschichte, Vol. 16, No. 4, 1992, pp. 31-32.

²⁵⁴ McNair, A., The Law of Treaties, 1961, p. 162; quoted from: Palmer, G., New Ways to Make International Environmental Law, in: American Journal of International Law, Vol. 86, No. 2, April, 1992, p. 264. - see also: Gareis, S. B., Kleinsten gemeinsamer Nenner. Grenzen der Macht in der UNO, in: Information für die Truppe (Zeitschrift für Innere Führung), No. 2, February, 1997, pp. 33-34.

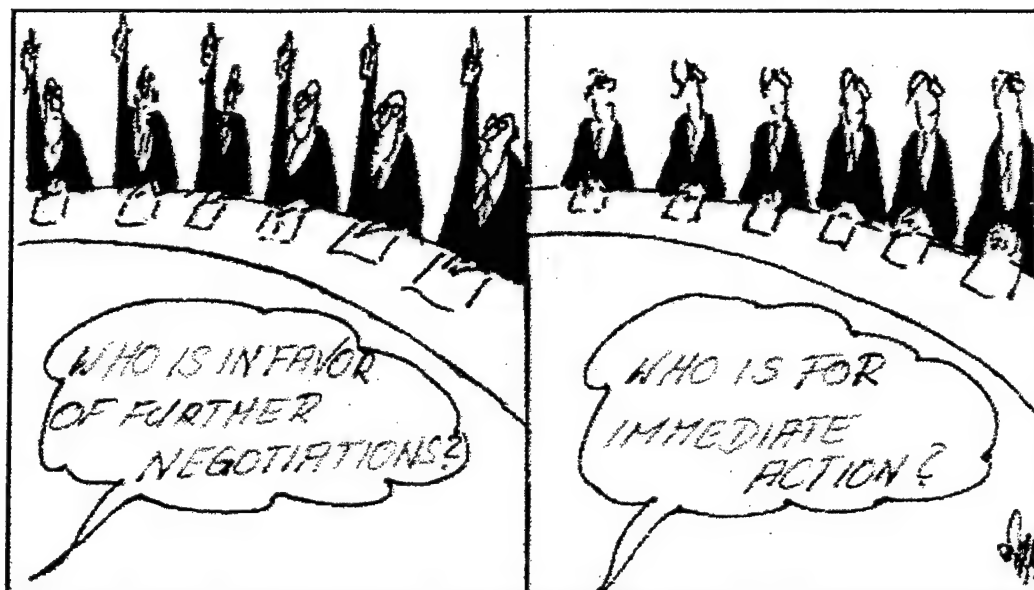


Figure 20. "Multilateral Diplomacy"

(NOZ, 22 July 1995, translated into English)

Instead of having a new group of nations assemble to discuss each problem by holding a series of international meetings at different locations around the world in an effort to hammer out a consensus on the provisions of a multilateral convention, there could easily be a uniform method for bringing the nations together, conveying the relevant scientific information to them and conducting the negotiations.²⁵⁵

New institutional mechanisms can bypass this requirement and speed the process. If these goals are not met, there will be an ongoing need of intensified cooperation and multilateral diplomacy.

In any case, evolving ecologically induced causes for conflict may give reason for a historical turning point in diplomacy, as experienced after the Congress of Vienna, when the involved parties met regularly to prevent conflicts.

7. Foreign Aid

Several research projects have discovered that most of ecologically induced conflicts are taking or have taken place in developing countries. Figure 21 provides a rough survey of

²⁵⁵Palmer, G., New Ways to Make International Environmental Law, in: American Journal of International Law, Vol. 86, No. 2, April, 1992, p. 264.

the location of these conflicts and where conflicts may emerge. The figure can make no claim as an exhaustive survey but indicates the location of obvious conflicts. The reasons for this situation is complex and cannot be considered in detail in this study.

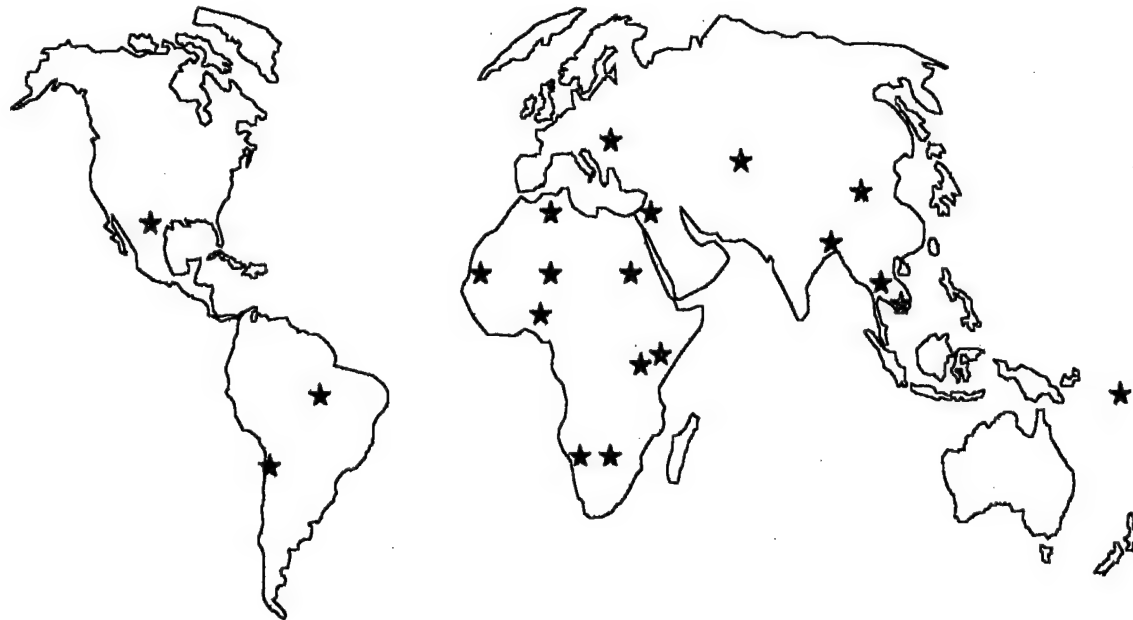


Figure 21. Ecologically Induced Conflicts Worldwide

The functional network between society and environment as a factor for development was recognized too late. The colonial and post-colonial exploitation of resources in the developing regions of the world with no consideration for conservation of those resources led to ecological damages. This has developed a base for causes for conflict.

This does not mean that this potential of conflict does not exist within the developed countries, but only that they can deal with such problems. This conclusion is supported by existing functional economic, technical and political instruments. In developed countries situations of conflict may be overcome with less difficulty. These mechanisms are missing in the developing countries or the mechanisms created do not work well.

In general, these conditions appear to be more prone to triggering violent conflict in developing countries than in industrialized states.²⁵⁶

²⁵⁶ Ecologic-Centre for International and European Environmental Research, Potsdam Institute for Climate Impact Research, Berlin, (ed.), NATO CCMS Pilot Study, Environment and Security in an International Context, State of the Art and Perspectives, Interim Report, October, 1996, p. 17.

Furthermore, the developing countries believe themselves pressed to damage the ecology as other access to capital, technology and improved living conditions will be refused. Ecological transformation in the developing countries, often based on enhancing impoverishment, leads to new disintegration and sparks social, regional and ethno-political causes for conflict.

The industrialized countries must make earnestly clear that they are willing to counteract the ecological disaster and its consequences. Only with such a signal, an important step is made to establish the preconditions for changing attitudes in the developing countries. In the past, attitudes of wealthy countries encourage other countries to adopt:

... a wait-and-see attitude (you solve your problems first, then talk to us about change).²⁵⁷

Turning the scientific and engineering strengths of the developed countries to the solution of the developing world's problems will support the change in attitude. North-South cleavages have to be replaced "... with a planetary sense of shared destiny."²⁵⁸

To reach a more efficient ecological policy, capacity building within the developing world is one of the most important measures.

The optimum mix of policies will vary from country to country, depending upon political structure and societal receptiveness.²⁵⁹

The ability of societies to respond to ecological challenges is fundamental. Therefore, the build-up of capacities that can combat ecologically induced causes for conflict applies especially to the developing world. Provision of educational programs²⁶⁰, institution-building

²⁵⁷ Mathews, J. T., *Redefining Security*, in: *Foreign Affairs*, Vol. 68, No. 2, 1989, p. 175.

²⁵⁸ *Ibid.*, p. 175.

²⁵⁹ Intergovernmental Panel on Climate Change, IPCC (ed.), *Climate Change 1995: Impacts, Adaptations, and Mitigation, Summary for Policymakers, Contribution of Working Group II to the Second Assessment Report*, Montreal, 1995, p. 21.

²⁶⁰ For instance, assistance in training or technical assistance for environmental impact and risk assessment

and respective instruments as well as technology and financial transfer may be able to fight the root of impoverishment and disintegration.²⁶¹

Many of these problems are global in scope and will require greater cooperation at the international level. Without such cooperation, the era of the Cold War may soon be replaced by the era of environmental conflict.²⁶²

The developing countries are confronted with an increasing number of ecological problems and they may have to deal with more conflicts within Third World. Against this background of experience, the insight is that development is not possible without peace. Also peace will not exist in long term without development. Foreign aid in cooperation with diplomacy and security policy can be seen as an additional contribution to prevent violent conflicts and to stabilize societies.²⁶³

²⁶¹ Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung. Abschlußbericht des Environment and Conflicts Project ENCOP, Band I*, Verlag Rüegger AG, Chur/Zürich 1996, p. 29.

²⁶² Gleick, P. H., *Environment and Security: The Clear Connections*, in: *Bulletin of the Atomic Scientists*, Vol. 47, No. 3, 1991, p. 21.

²⁶³ Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung. Abschlußbericht des Environment and Conflicts Project ENCOP, Band I*, Verlag Rüegger AG, Chur/Zürich 1996, p. 8.

VII. CONCLUSIONS

In the past, new threats, including ecologically induced causes for conflict, were not sufficiently perceived. Their global dimension and incongruity of ecosystems and state territory has led to misperception and miscalculation concerning the consequences related to security. One example is the Central Asian region. After the collapse of the Soviet Union and the independence of the new Central Asian republics water distribution as one cause for conflict became politically relevant. The postulated "sovereignty over own resources" is incompatible with the need of an ecoregion-oriented view.²⁶⁴

Further ecological problems such as soil degradation, water pollution, climate change and health problems were often ignored. Even now, awareness of the extent of ecological sources of threat and its relevance to security is not well understood. In the Central Asian region, national interest and economic growth is the primary objective. This disregards harmful ecological transformation induced by human activities and its potential for creating conflict. Although more structured efforts must be undertaken to substantiate findings of this study of the relationship of ecology and security in the Central Asian region, its abundantly clear that ecological issues are no longer to be regarded as a "second class politics" field, but are of great importance.

The significant ecological causes for conflict in the Central Asian region are water and land shortages, resulting from irrigation, storage of water resources, erosion, salinization, desertification and toxic contamination. From these causes for conflicts, conflicts of different severity from open to violent evolved. These conflicts are characterized by contentions over the use and exploitation of resources, especially land and water, for example, up-/ down-stream conflicts, and discontent about impoverishment.

²⁶⁴ Klötzli, S., The Water and Soil Crisis in Central Asia - a Source for Future Conflicts? in: Bächler, G., Spillmann, K. R. (eds.), *Environmental Degradation as a Cause of War - Kriegsursache Umweltzerstörung. Regional and Country Studies of Research Fellows - Regional- und Länderstudien von Projektmitarbeitern*, Vol. II, Verlag Rüegger AG, Chur/Zürich 1996, p. 251.

Usually, the relationship between ecological causes for conflict and conflicts is not mono-causal. Mostly, different causes for the conflict are acting in combination, these are ecological as well as other socio-economic factors. In some cases ecologically induced causes for conflict are serving only as an independent background variable or inducing secondary problems like migration. The setting of conflicts is often caused by economic and ethnic factors. These conflicts occur between the independent states as well as within the states. In the Central Asian region ecologically induced conflicts mainly emerge on a sub-national level.

The interweaving and interrelation of ecological and non-ecological factors and the complexity of different causal pathways make it difficult to predict the future development of conflicts (See Figure 22). This is especially true on international level. The conclusions with regard to the Central Asian region have shown that more detailed databases are required for a thorough analysis of the relationship between the ecological situation and the primary conflict fault lines. The connections between ecological, economic, socio-cultural, ethnic factors and government response requires further investigation.

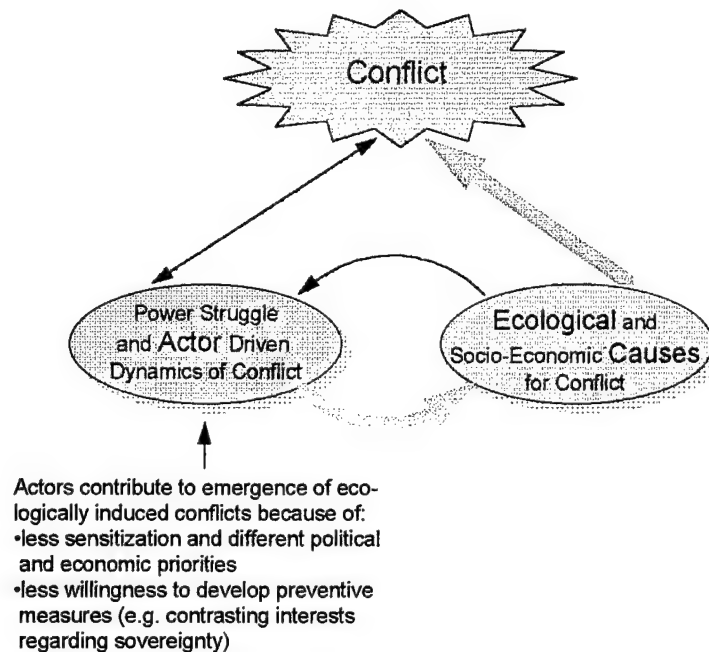


Figure 22. Interrelation between Actors and Ecological Causes for Conflict Inducing Conflicts

The economic inter-dependence and common hardship counterbalance the risks of conflict. But extreme economic decline in the region can aggravate the proneness to focus on the individual interests and disregard the necessity of cooperation. Presupposing such a situation open conflicts especially about water resources can escalate to the international level. Although other ecological risks such as water pollution and climate change are becoming more relevant they are not given sufficient importance. A perception of ecologically induced threat merely exists. Nevertheless these risks have the potential to constitute causes for conflict. Significant preventive measures are only taken to address the water problem.

Because of less sensitivity and a focus of national interest on national economic development programs the need for prevention is poorly recognized. Lack of knowledge or even ignorance concerning the dimensions and consequences of ecological risks, fatalistic behavior of the people and partially of ecological problems aggravates the situation. Insufficient political will and sensitivity of the political decision-makers for a needed change of economic and political priorities make the development and establishment of preventive measures more difficult.

Increasing nationalistic tendencies are crucial in the process of creating preventive mechanisms. These aspects may increase the potential of conflict between the states. In some cases mutual economic inter-dependence among the new states, especially Uzbekistan and Kyrgyzstan, makes it necessary to cooperate. Insufficient financial resources and common hardship after the Soviet era are factors forcing an arrangement with the other independent states and promote the creation of preventive measures. However, bilateral economic agreements instead of multilateral agreements between the new independent states still dominate the situation of cooperation.

The intra-regional agreement that recognizes the severe ecological consequences of the desiccation of the Aral Sea focuses primarily on the water problem and economic aspects of water utilization. The ineffective legal strength of the agreement makes the solution of such essential questions and its financing almost impossible. The water agreement is an attempt to establish an equitable system of water distribution. The ineffective legal value of the water agreement and legally binding force of the agreement make the agreement less than successful.

The suspension of joint control, and nationalization of water distribution facilities are counterproductive measures regarding progress of prevention.

Water is still regarded as strategic resource and should remain state property. Surrender of sovereignty is required, but there is not a willingness by the republics to hand over responsibilities to intra-regional institutions.

This affects an efficient institution-building process. Although an Interstate Commission for the Aral Sea (ICAS) and an Interstate Fund for the Aral Sea (IFAS) as well as an Intergovernmental Coordination Committee for Water Supply were established; these joint institutions are not supported or adequately equipped with rights and power. Institution-building is required on local, regional and intra-regional levels because disputes can occur any of these levels. But the surrender of responsibilities, indecisiveness and less cooperation between the new states make the comprehensive planning and management of resources more difficult. Foreign aid can alleviate the situation by providing capacity building in general, realization of an efficient water management, land use reform, privatization and crop diversification.

The findings of this examination of the Central Asian region have unexpected and surprisingly significant implications to international security policies. This does not mean that the findings from the Central Asia case should be generalized. This would be misleading and methodologically it is not permitted to draw conclusions and project them from a specific case to a general approach. But the results should indicate direction regarding the global level. Although many ecologically induced conflicts in Central Asia took place on a national level, the results of the study shows the great extent of the international dimension, inherent in ecological threat.

In a global view, 95 % of ecological problems have their origins within the territorial borders of sovereign states. Because of the processes of external shift, 70 percent of all human induced sources of ecological threat are emerging outside of the sphere of influence of sovereign states (ozone depletion, climate change, oceans).²⁶⁵ China is expected to become the

²⁶⁵ According to UN (UNEP) estimates - quoted from: Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege*

most significant polluter of the atmosphere and may contribute more than other countries to the phenomenon of global warming. Presupposing the appearance of rising sea levels and flooding in highly populated coastal areas, global warming may induce causes for conflict because of land shortages.

This international and even global relevance require a more global oriented approach to solutions. Focusing on policy-oriented measures one possible approach should be based on the following factors:

- Raising awareness of the relationship of ecology and security and its consequences
- Further intensification of theoretical and conceptual debate about an extension of security
- Creation of a comprehensive system of policy-oriented preventive measures with specific regard to the field of security. This system should include:
 - International ecological law improvement
 - Renunciation of sovereignty must be considered (surrender some sovereignty)
 - Institution-building (authoritative organ), especially on global level is essential and has to be associated with a functional international management (monitoring, verifying compliance, enforcement)
 - Increased application of cooperative mechanisms, new models of diplomacy and intensification of cooperation should support the above mentioned measures
 - As a part of cooperation, especially between developing and developed countries foreign aid is still important. Counter-acting ecological induced conflicts which emerge much more in the developing world means capacity building in these countries. Yet, this survey does not claim to be exhaustive

The global environmental problems pose three specific challenges: setting the rules, monitoring and verifying compliance, and providing an authoritative and binding method of setting disputes.²⁶⁶

The importance of international law, regime-building, international cooperation and global institution-building is increasing. On the other hand, the sovereign states continue playing their role as a basic actor in international politics. However, a shift of authorities and rights to international institutions is expected. Sovereignty increasingly faces controversial debates. Nevertheless progress can only be achieved by consent. This is a primary reason why it would be difficult to realize global oriented measures shown in Figure 23.

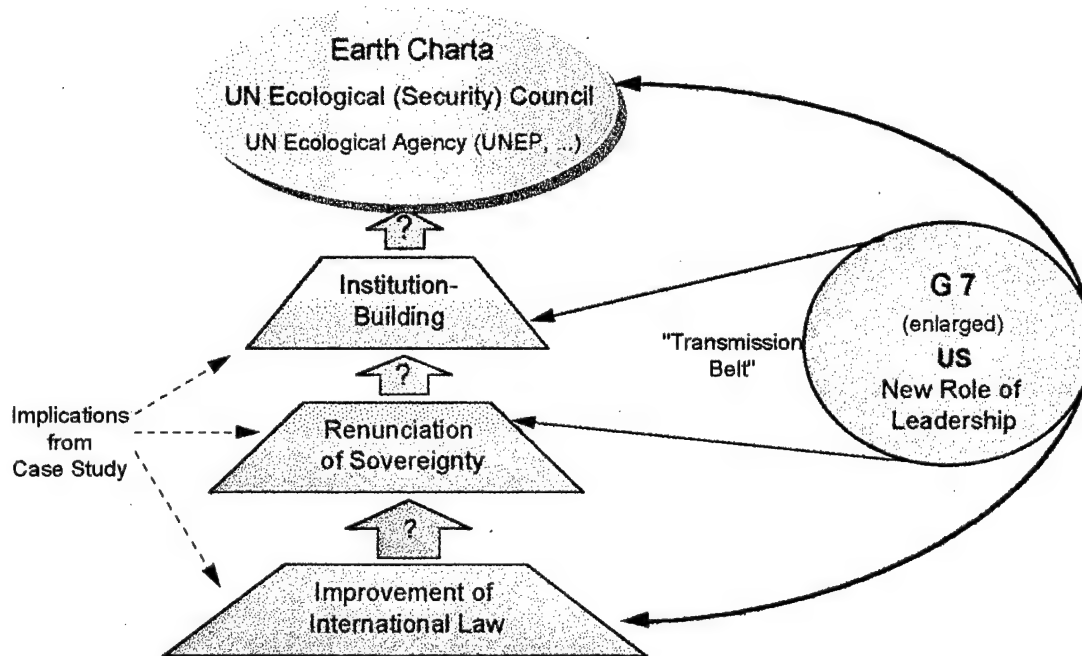


Figure 23. "Imaginable Global View" to Prevent Future Ecologically Induced Conflicts

As a first step the improvement of international ecological law seems necessary to build the framework for a renunciation of sovereignty, allowing for efficient institution-building. Referring to the difficulties of consent building the realization of these goals is problematic and

²⁶⁶ Statement by the former Prime Minister of New Zealand, quoted from: Barandat, J., Wasser, Regionaler Konfliktstoff weltweiter Bedeutung, in: Institut für Friedensforschung und Sicherheitspolitik an der Universität Hamburg (IFSH), Hamburger Beiträge zur Friedensforschung und Sicherheitspolitik, Heft 96, Hamburg, November, 1995, p. 17.

time consuming. A group of the major powers such as the Group of Seven in an enlarged form may support and accelerate this process. This presupposes that consent within this smaller group is achievable. Probably success within this group depends on the informal leadership of one major power. This could be a new role of leadership for the U.S. of achieving consent and overcoming challenges in negotiating. This may be a first step to gain higher objectives. Reaching consent among the major powers and accelerating the process of building a global ecological organization are seen as an interim phase supported by the major powers. This would convince other countries to accept this approach.

From an idealistic view there is no alternative to a global institution guided by the norms of an Earth Charta. As the Economic and Social Council an ecological (security) council should be established to which all the ecological organizations should report. As an organ of this council the UNEP seems to have the most expertise at the moment. In the past, UNEP has been involved in the most important projects on the global level.²⁶⁷ A global institution is required, because most of the problems have a global dimension. Although institutions are needed on all levels, a global institution is necessary because global problems can not be solved on regional or local level. Causes for conflict produced in one part of the world can create cause for conflict and damage in another part of the world. This transfer of instability will not be fully understood until we all become aware of the Earth as a common life-support system that needs protection of its atmosphere, water resources and soil.

Further studies that may amplify or qualify the findings of this thesis regarding preventive measures could include:

- Other cases than the Central Asian region should be examined, focusing on policy-oriented preventive measures. If a similar pattern of research results arise a generalization may be permissible. This would substantiate the model of an "Imaginable Global View" to prevent future ecologically induced conflicts. Presupposed the availability of more complete databases, a means for crisis identification could be created. A preliminary identification of early-warning-indicators could be realized

²⁶⁷ Bächler, G., Böge, V., Klötzli, S., Libiszewski, S., Spillmann, K. R., *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung, Abschlußbericht des Environment and Conflicts Project ENCOP, Vol. I, Verlag Rüegger AG, Chur/Zürich 1996, pp. 348-350.*

- The behavior of international organizations, especially the UN, and the major actors attitudes to the model of an "Imaginable Global View" to prevent future ecologically induced conflicts
- Improvement to international law, renunciation of sovereignty, and institution-building related to ecological problems and the field of security
- Importance to non-government organizations for the prevention of ecological induced causes for conflict

The difficulty in all these recommendations and implications is that time is often too short to allow a telling reflection of the lives of future generations in the coming Third Millenium.

If we fail to address these [environmental] threats today, we will suffer the consequences in all our tomorrows.²⁶⁸

²⁶⁸ President Clinton, State of the Union Address, January, 1996. Quoted from: Wasserman Goodman, S.: Environment and National Security, A New DoD Mission, Speech at National Defense University, August 8, 1996, p. 8.

APPENDIX

The following table provides a rough overview of existing institutions and the most important agreements with regard to the United Nations. The structure of the table is theme-related, for example, sustainable development, climate change, water scarcity, etc.

Additionally, other institutions, state and U.S. are considered because of their relevance to the ecological and the search for solutions to problems.

Table 4. Rough Overview of Significant International Agreements/Institutions Fighting Ecological Sources of Threat²⁶⁹

Theme	Responsibility Spatial Dimension	Agreements	Institutions / Meetings	Objectives	Initiative / run by	Coordination	Previous / Upcoming Events
Sustainable Development	UN270 Global	Agenda 21	UNCSD271	Annual meetings to review progress and propose policy guidelines implementing the agreement - a global plan for sustainable development	UN Conference on Environment and Development 272		April, 8-25

²⁶⁹ Rearranged blend of: UN Department of Public Information (ed.), The United Nations: Protecting the Global Environment, DP/1814 (published on the Internet), April, 1996. - Schick, J., The Integration of Environmental Issues into U.S. Foreign Policy, lecture given at the U.S. Naval Postgraduate School, Monterey, CA, 3 April, 1997. - United Nations Department for Policy Coordination and Sustainable Development (ed.), Preparations for the Special Session of the General Assembly for the Purpose of an Overall Review and Appraisal of the Implementation of Agenda 21, Implementation of the Convention on Biological Diversity, Note by the Secretary-General, (published on the Internet), February 25, 1997.
Ecological threat from nuclear sources (non-proliferation-issues) and military activities (conversion of military equipment, Kola peninsula, Arctic Military Environmental Cooperation, AMEC) are not considered in this table.

²⁷⁰ United Nations

²⁷¹ United Nations Commission on Sustainable Development - Annual meetings to review progress and propose policy guidelines implementing the agreement

²⁷² Also known as "Earth Summit", "Rio Conference"

Theme	Responsibility Spatial Dimension	Agreements	Institutions/ Meetings	Objectives	Initiative/ run by	Coordination	Previous/ Upcoming Events
Climate Change (Air Pollution)	UN Global	UN Framework Convention on Climate Change	Third Conference	Commitment to reduce greenhouse gases	UN Conference on Environment and Development		December, 1-12
	UN Global		IPCC273	Established in 1988, reviewing scientific research on climate change, human influence on the global climate, formulation of response strategies		UNEP274, World Meteorological Organization (UN Agency)	
	UN Global	Montreal Protocol	Ninth Conference	Further attempt to decrease ozone-depleting chemicals			September, 10-18
	UN Europe, North America	Convention on Long-Range Transboundary Air Pollution (1979)	UN Economic Commission for Europe	Reduction of acid rain			
	U.S. - Brazil Regional	Common Agenda Agreements - bilateral		Cooperation on satellite surveillance of the Amazon rainforest			
	U.S. - India Regional	Common Agenda Agreements - bilateral		Private investment in energy efficient power generation			
	U.S. - Japan Regional	Common Agenda Agreements - bilateral		Policy coordination before conference to the Climate Change Convention in Kyoto			

²⁷³ Intergovernmental Panel on Climate Change

²⁷⁴ United Nations Environment Program

Theme	Responsibility Spatial Dimension	Agreements	Institutions / Meetings	Objectives	Initiative / run by	Coordination	Previous / Upcoming Events
Water Scarcity							
Soil Degradation		Convention to combat Desertification	First Conference FAO275				September, 22 - October, 3
Biodiversity	UN Global	Convention on Biological Diversity276	Ad Hoc Working Group on Biosafety	Obligations to protect plant and animal species through habitat preservation and other means. UNEP report from 1995 showed unprecedented species extinction and habitat loss.	UN Conference on Environment and Development	UNEP	May, 12-16
Deforestation			Intergovernmental Panel on Forest 1995 FAO	Assessment of the necessity for a legal agreement on forests, considerations on global policies on eco-labeling of wood products and other issues, effort to establish certification regime for sustainably managed forests.	UNCSD		
Water Pollution							

²⁷⁵ UN Food and Agriculture Organization

²⁷⁶ United Nations Department for Policy Coordination and Sustainable Development (ed.), Preparations for the Special Session of the General Assembly for the Purpose of an Overall Review and Appraisal of the Implementation of Agenda 21, Implementation of the Convention on Biological Diversity, Note by the Secretary-General, (published on the Internet), February 25, 1997.

Theme	Responsibility Spatial Dimension	Agreements	Institutions/ Meetings	Objectives	Initiative/ run by	Coordination	Previous / Upcoming Events
Other Scarcities	UN Global	Regulation of Fishing on the High Seas	FAO	Prevention of overfishing and deconflict tensions concerning competition over fish stock depletion	UN Conference on Environment and Development		
Toxic Waste Disposition	UN Global	Basel Convention on Hazardous Waste	Intergovernme ntal Negotiating Committee on Prior Informed Consent for Trade in Hazardous Chemicals?	1995 strengthened to outlaw the export of toxic waste to developing countries		UNEP	May, 26-30
	UN Global	Convention on Oil Pollution	International Maritime Organization	Ban oil pollution from ships, control disposal of garbage from ships			
Financing for the Environment	UN Global		GEF277	Main source of multilateral lending to developing countries for environmental projects		World Bank, UNDP278, UNEP	

²⁷⁷ Global Environment Facility
²⁷⁸ United Nations Development Programme

Theme	Responsibility Spatial Dimension	Agreements	Institutions / Meetings	Objectives	Initiative / run by	Coordination	Previous / Upcoming Events
Global Monitoring	UN Global		GEMS279	Cooperation, monitoring changes concerning atmosphere, climate, water pollution and other ecological threats.			
Miscellaneous / General	NATO North Atlantic Region		North Atlantic Cooperation Council	Instrument for NATO's support of the reform process in the Central and Eastern Europe. "... NACC focuses on regular consultations and civilian aspects of the reform process, including the conversion of arms industries. Of particular value to Norway is the NACC's potential as a forum for the management of environmental problems related to military activity." ²⁸⁰			
	NATO North Atlantic Region		Committee on Challenges to Modern Society				April, 24-25

²⁷⁹ Global Environmental Monitoring System

²⁸⁰ Bjerke, S., The Environment and Security in the North Atlantic Region (speech at a conference, published on the internet), Reykjavik, 7 September 1995, p. 2.

Theme	Responsibility Spatial Dimension	Agreements	Institutions/ Meetings	Objectives	Initiative/ Run by	Coordination	Previous/ Upcoming Events
	G 7 Global		Environment Ministers				May, 5-6
	U.S. - European Commission Global	Common Agenda Agreements - bilateral/multilate ral		New Transatlantic Agenda for dialogue on a range of environmental issues			
	U.S. - Russia Mainly Regional (Russia)	bilateral	Gore- Chernomyrdin Commission	Ecological risk assessment on gas and oil operations in Russia, concept paper on an international carbon emissions trading regime			

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